UNIVERSITY LIBRARY DEC 12 19

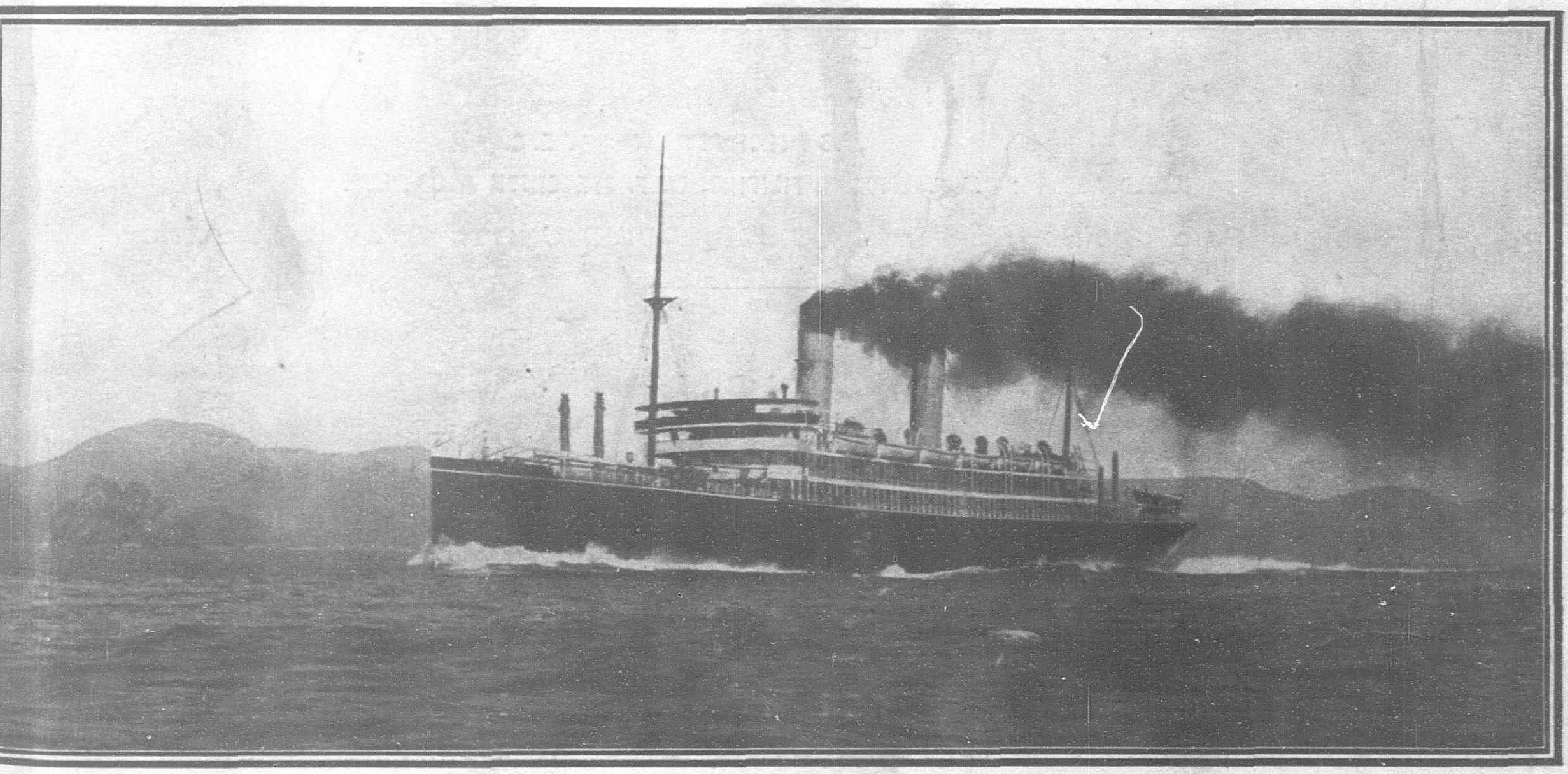
Complimentary

THE FAR EASTERN REVIEW

VOL. VIII.—No. 5. MANILA AND SHANGHAI, OCTOBER, 1911. 25 cents, U. S. Cy.

IMPERIAL CHOSEN RAILWAYS

The Opening of the KOWLOON-CANTON RAILWAY



The New Toyo Kisen Kaisha's Pacific Greyhound, the "Shinyo-maru," Built and Engined by the Mitsu Bishi Dockyard & Engine Works at Nagasaki

The Chapei Water and Electrical Works

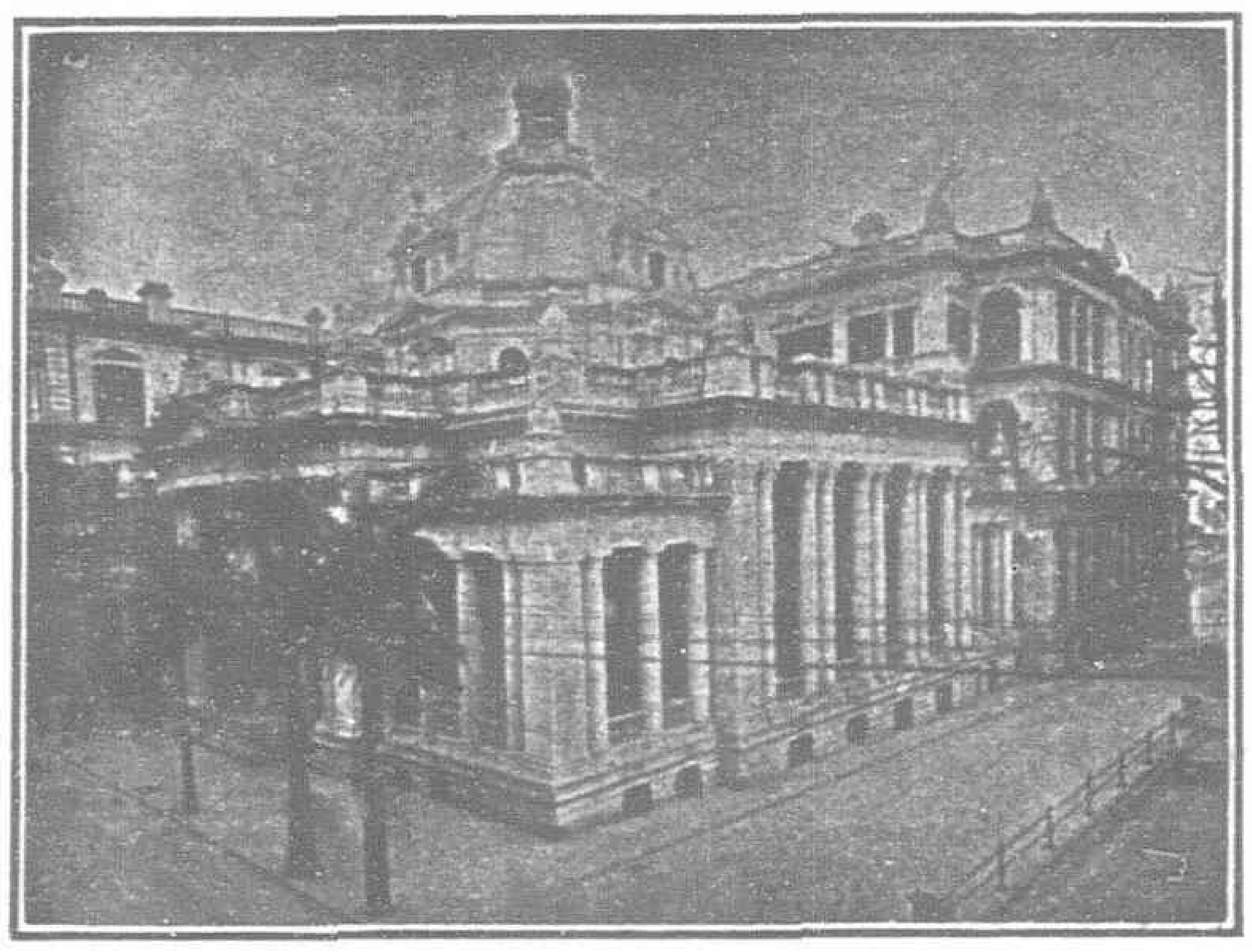
Hongkong and Shanghai Banking Corporation

DEPOSITORY OF THE GOVERNMENT OF THE PHILIPPINE ISLANDS

Capital (Paid in Cash).........$15,000,000
Sterling Reserve Fund......$15,000,000
Silver Reserve Fund............$16,750,000
Reserve Liability of Prop'rs.$15,000,000

COURT OF DIRECTORS:

G. H. MEDHURST, Esq.
Chairman.
E. SHELLIM, Esq.
Deputy Chairman.
F. H. ARMSTRONG, Esq.
W. L. PATTENDEN, Esq.
ANDREW FORBES, Esq.
G. FRIESLAND, Esq.
G. S. GUBBAY, Esq.
G. R. LAURENZ, Esq.
F. LIEB, Esq.
HON. MR. C. H. ROSS
H. A. SIEBS, Esq.



Head Office, Hongkong and Shanghai Banking Corporation, Hongkong

BRANCHES AND AGENCIES:

AMOY
BANGKOK
BATAVIA
BOMBAY
CALCUTTA
CANTON
COLOMBO
FOOCHOW
HAMBURG
HANKOW
HONGKEW (SHANGHAI)
HONG-KONG
IPOH
JOHORE
KOBE
KUALA LUMPUR
LONDON
LYONS
MALACCA
MANILA
NAGASAKI
NEW YORK
PEKING
PENANG
RANGOON
SAIGON
S. FRANCISCO
SHANGHAI
SINGAPORE
SOURABAYA
TIENTSIN
YLOILO
YOKOHAMA

CORRESPONDENTS—In Samar and Leyte: WARNER, BARNES & CO., LTD.
CORRESPONDENTS—In Cebu: KER & CO.
LONDON OFFICE—31 Lombard St.
LONDON BANKERS—London County and Westminster Bank, Ltd.

Interest Allowed on Fixed Deposits at Rates which may be Learned on Application. Credit Granted on Approved Securities and Every Description of Banking and Exchange Business Transacted. Drafts Granted on London and the Chief Commercial Places in Europe, India, Australia, America, China and Japan.

N. J. STABB, Chief-Manager - - - - HONGKONG **A. M. REITH, Acting Manager - - - MANILA**

WADE GARDNER, Agent, 50 Wall Street, New York.
W. H. HARRIES, Agent, 401 Montgomery Street, San Francisco

INTERNATIONAL BANKING CORPORATION

HEAD OFFICE, 60 WALL STREET. NEW YORK

LONDON OFFICE, 36 BISHOPSGATE STREET, E. C.

ILOILO AGENTS: BANCO ESPANOL FILIPINO, W. F. STEVENSON & CO., LTD.

CAPITAL PAID UP AND SURPLUS, $6,500,000.00 UNITED STATES CURRENCY

THOMAS H. HUBBARD, President
JAMES S. FEARON, Vice-President

BRANCHES

Bombay
Calcutta
Canton
Cebu
Colon
City of Mexico
Empire, C. Z.
Hankow
Hongkong
Kobe
Manila
Panama
Peking
San Francisco
Shanghai
Singapore
Washington, D. C.
Yokohama

AGENCIES AND CORRESPONDENTS IN ALL PRINCIPAL CITIES OF THE WORLD
DESIGNATED DEPOSITORY FOR THE FUNDS OF THE GOVERNMENT OF THE PHILIPPINE ISLANDS
AND FOR THE FUNDS OF THE GOVERNMENT OF THE CANAL ZONE
GENERAL FOREIGN BUSINESS TRANSACTED
COMMERCIAL AND TRAVELLERS' LETTERS OF CREDIT ISSUED
BILLS OF EXCHANGE AND CABLE TRANSFERS BOUGHT & SOLD

THE FAR EASTERN REVIEW
COMMERCE ◆ ENGINEERING ◆ FINANCE

VOL. VIII. MANILA, P. I., SHANGHAI, AND YOKOHAMA, OCTOBER, 1911 No. 5.

THE IMPERIAL CHOSEN (KOREAN) RAILWAYS

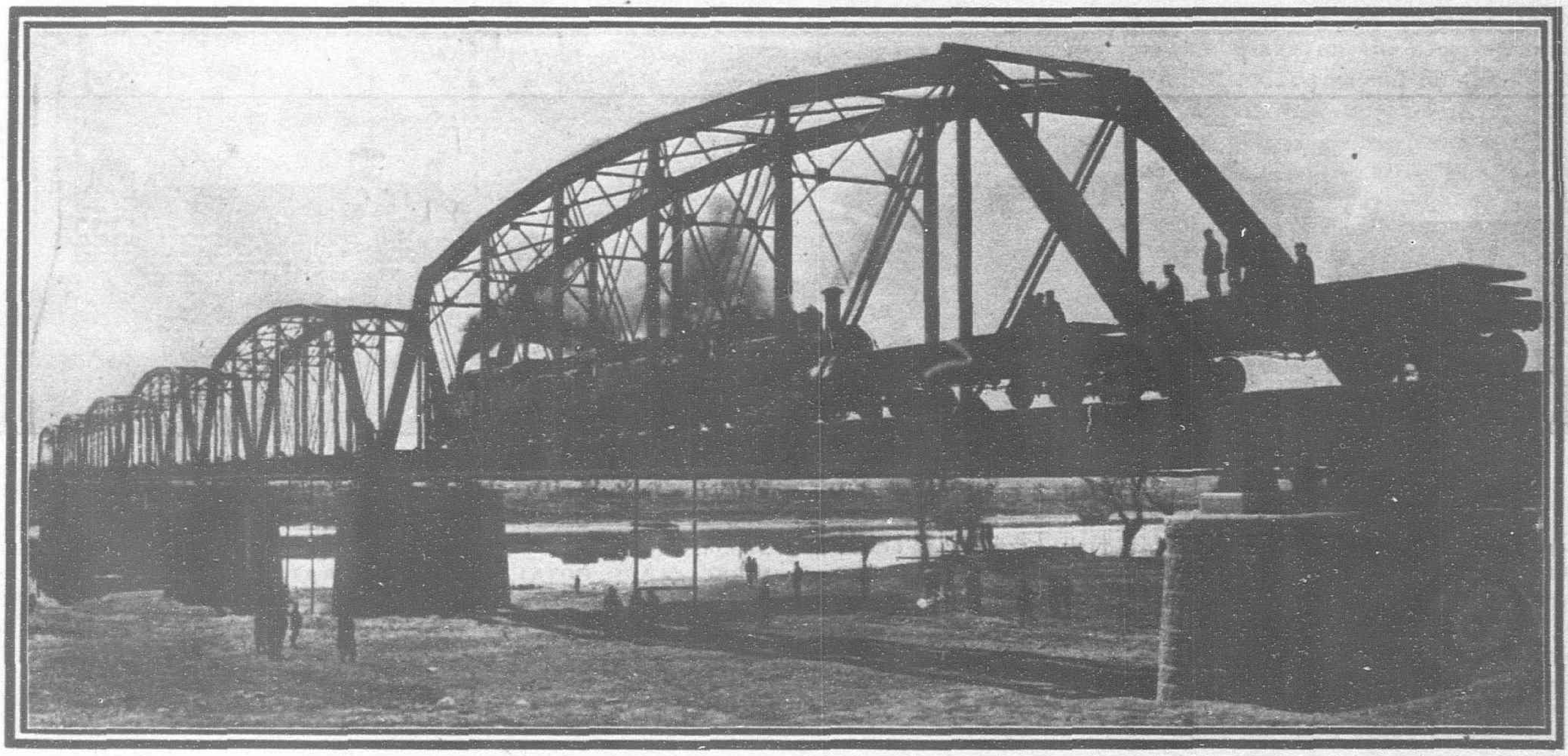
GENERAL INFORMATION

The Chosen Railway line begins at the Port of Fusan situated on the southeastern extremity of the peninsula and running in a north-western direction, terminates at Shingishu (Shin Wi Ju) on the bank of the River Yalu which divides the country from China, after touching Taikyu (Taiku), Keijyo (Seoul), Heijyo (Pying Yang), and other important cities and towns on its course. It is under the control of the Railway Bureau of the Governor General of Chosen.

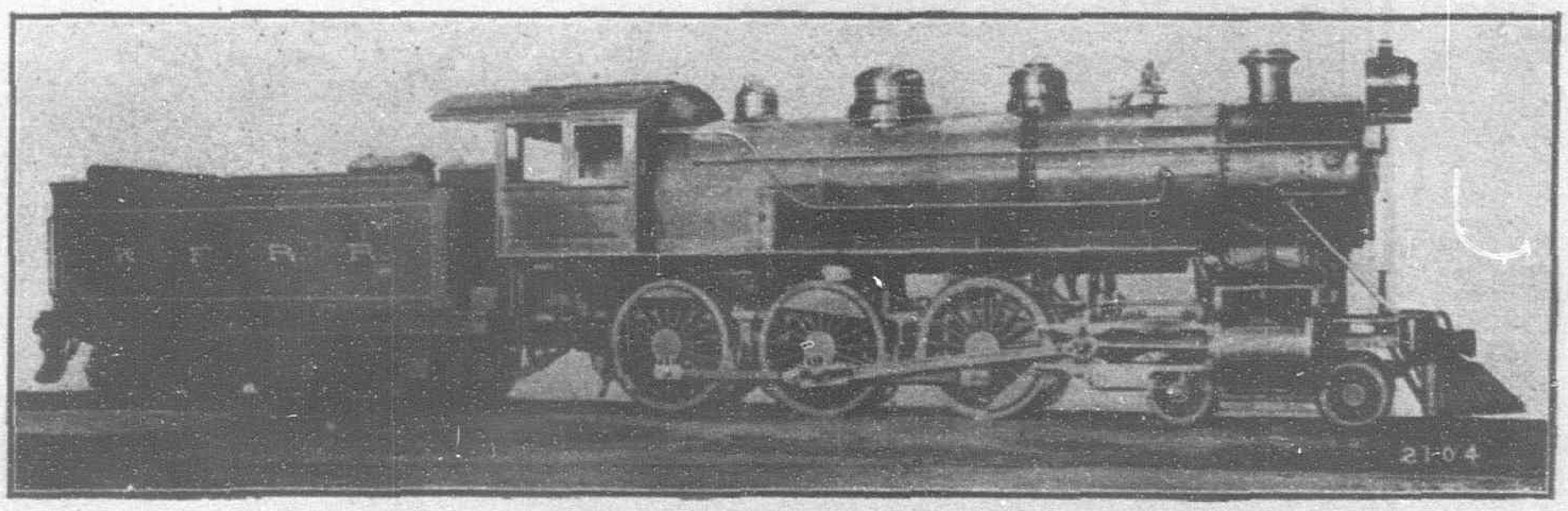
It consists of two trunk lines—the Keijyo-Fusan line and the Keijyo-Shingishu line—which pierce the peninsula, besides several branch lines leading to the ports of Masan, Jinsen (Chemulpo), Chinnampo, Kenjiho (Keum E Po), and the town of Hekirando (Pyoklan to), with an aggregate length of 675 miles. It is the shortest overland route joining Japan, Korea and South Manchuria, as well as Siberia and Europe and will undoubtedly become one of the most important stock lines for the round the world traffic upon the completion of the building of the bridge over the River Yalu which will be finished by the end of this year, as well as of the reconstruction of the Mukden-Antung line under control of the South Manchurian Railway Company.

The Governor General of Chosen with the aim in view of improving the condition of the country is endeavouring to adjust traffic facilities for the developement of the country's industry and commerce. To attain this purpose, the construction of two new lines has been taken in hand by the Railway Bureau since the year 1910. One is the Konan line and the other the Keijyo Gensan (Seoul-Wonsan) line.

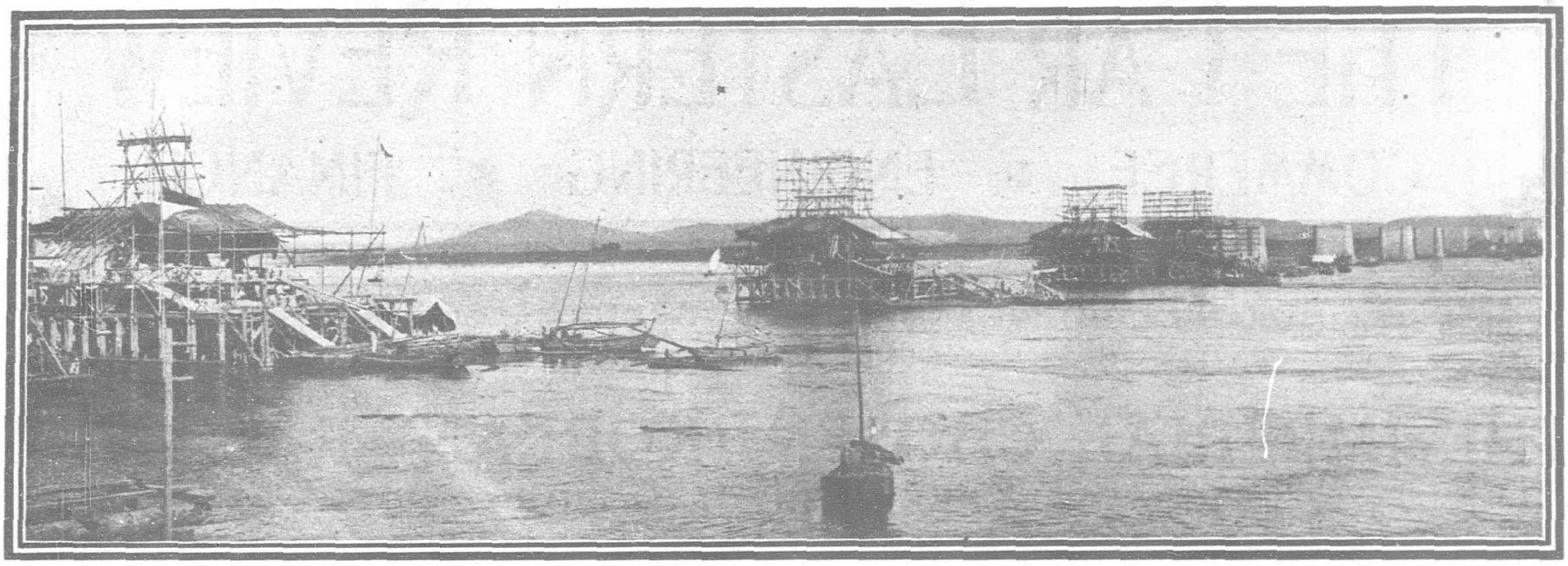
The Konan (Honan) line diverges from Taiden (Taichon) on the Keijyo-Fusan (Se-



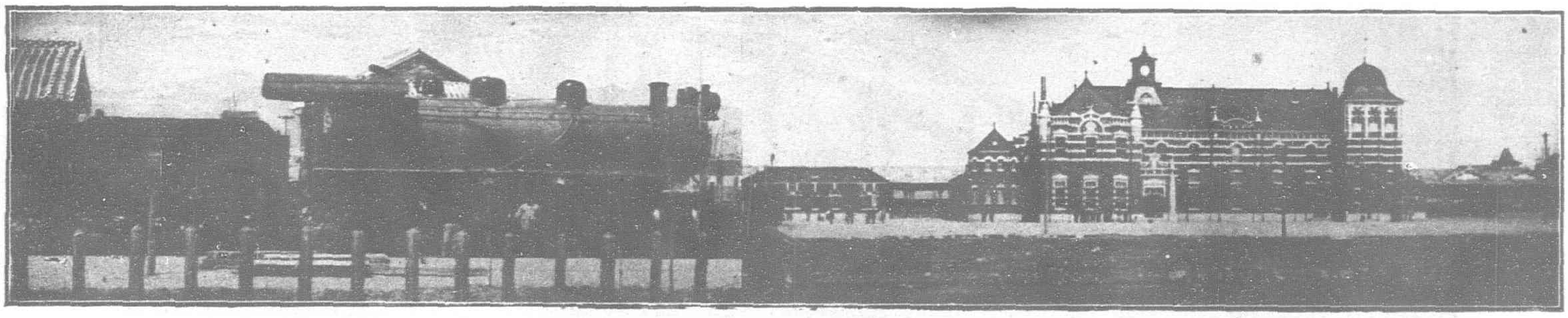
THE IMPERIAL CHOSEN RAILWAYS.—THE SECOND DAI DO RIVER (TAITONG KANG) RAILWAY BRIDGE.—THREE SPANS, 60 FEET LONG EACH, AND SIX SPANS, 200 FEET LONG EACH, TOTAL LENGTH, 1,436 FEET, DISTANT 161.77 MILES FROM RYUZAN STATION ON THE RYUZAN-SHINGISHU LINE



TYPE OF BALDWIN LOCOMOTIVES USED ON THE IMPERIAL CHOSEN RAILWAYS



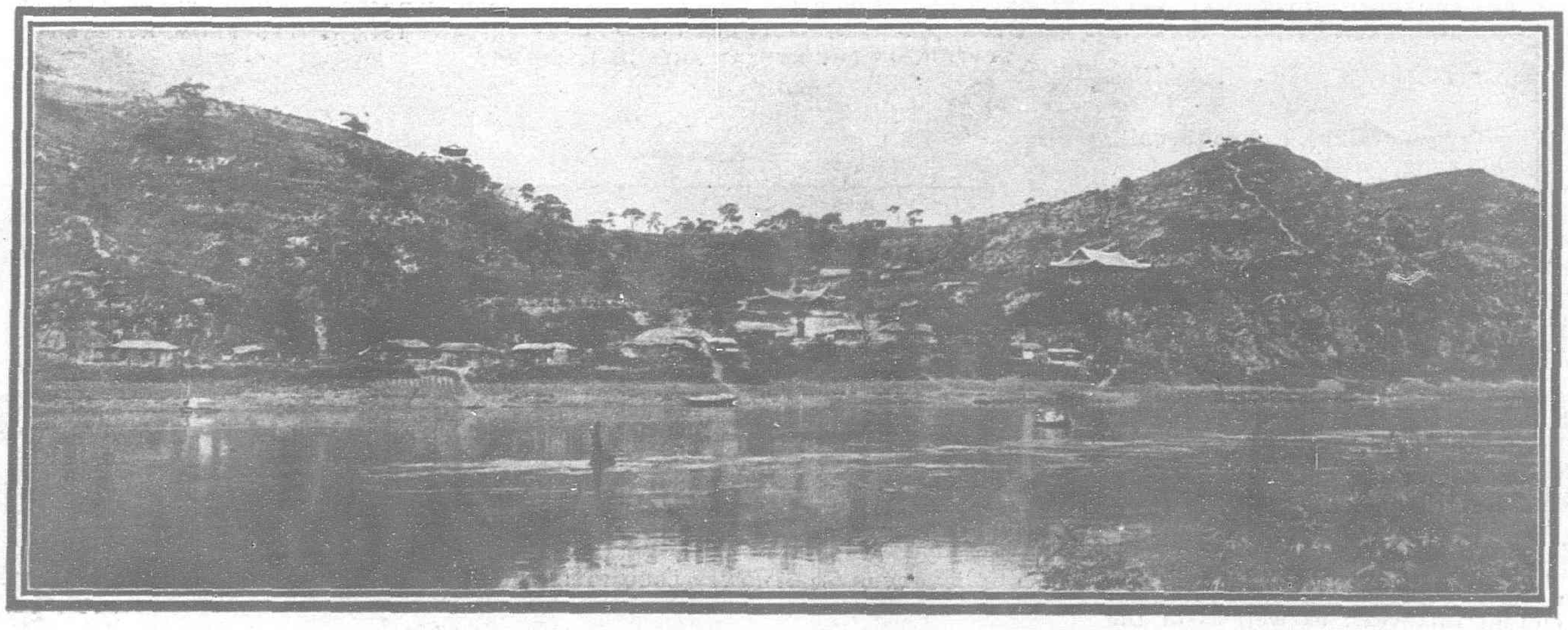
IMPERIAL CHOSEN RAILWAYS.—YALU RIVER BRIDGE UNDER CONSTRUCTION.—TOTAL LENGTH 3,100 FEET.—SIX SPANS, 200 FEET LONG EACH, AND SIX SPANS, 300 FEET LONG EACH.—ONE OF THE LATTER SPANS IS BEING BUILT TO SWING AT THE MIDDLE PART OF THE BRIDGE FOR THE PASSAGE OF VESSELS.—IT MARKS THE TERMINUS OF THE RYUZAN-SHINGISHU LINE.—WORK WAS COMMENCED IN AUGUST, 1909, AND IS EXPECTED COMPLETED BY DECEMBER OF THIS YEAR.



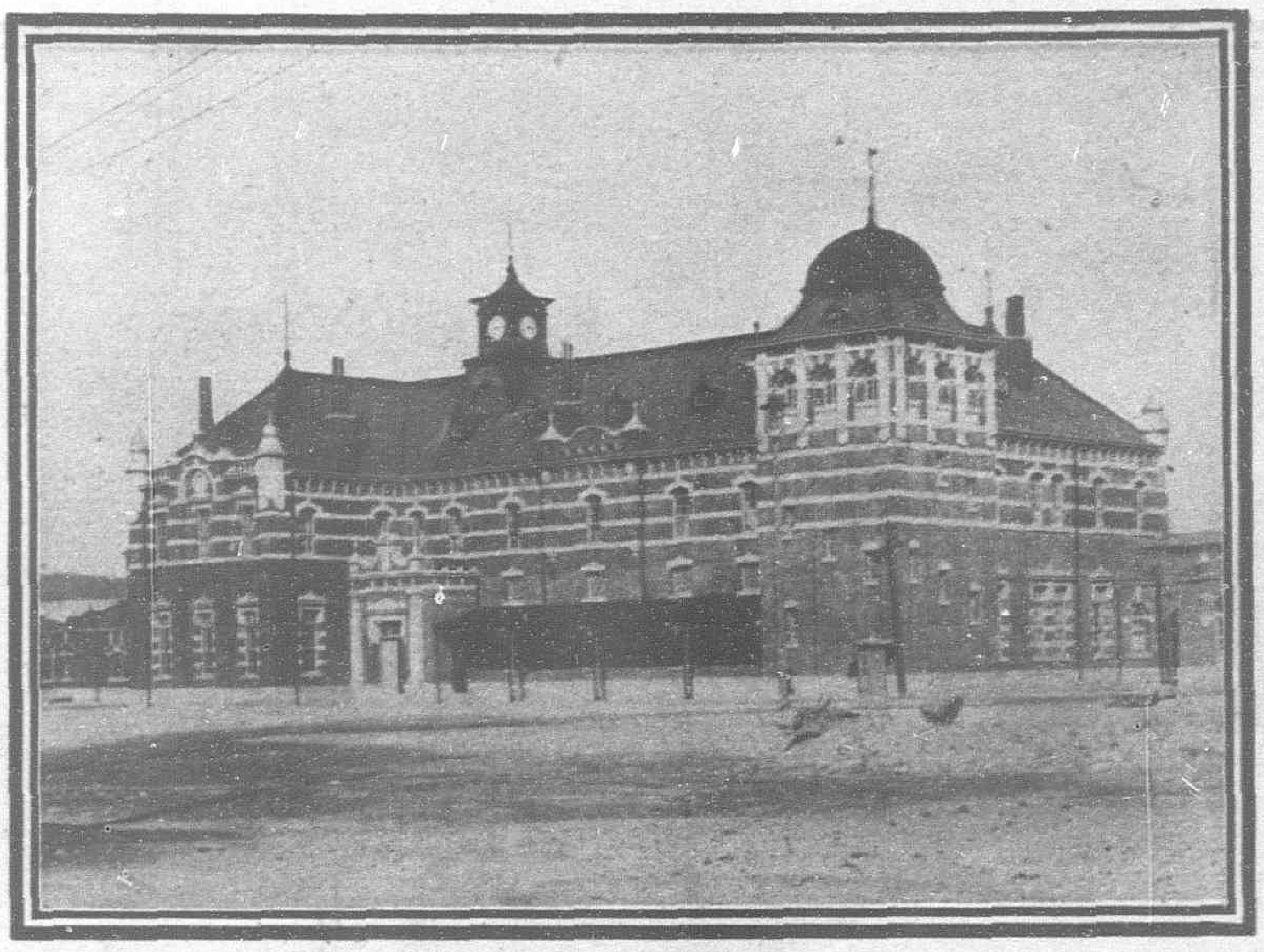
THE IMPERIAL CHOSEN RAILWAYS

FUSAN-SEOUL EXPRESS ENGINE, BUILT BY THE AMERICAN LOCOMOTIVE COMPANY, HAULING TRAIN OF EIGHT PASSENGER CARS OVER A TWO PER CENT GRADE

THE STATION AT FUSAN. THE UPPER FLOORS ARE ARRANGED AS A FIRST CLASS HOTEL, TO BE OPERATED IN CONNECTION WITH THE THROUGH SIBERIAN EXPRESS SERVICE, TO BE INAUGURATED NEXT SPRING ON THE COMPLETION OF THE ANTUNG-MUKDEN LINE.



AN OLD BATTLE FIELD OF THE SINO-JAPANESE WAR NEAR HEIJYO (PYANG-YANG)



IMP. CHOSEN RAILWAYS—RAILWAY STATION AND HOTEL AT FUSAN.

oul-Fusan) trunk line and leads to the port of Mokpo through an extensive rich plain in the Zenra (Chol-la) Province. It is so planned as to branch to the port of Kunsan from the neighborhood of Zenshu (Chon-Ju), and the centre of a fertile region. The total length of the line is 176 miles. As the above mentioned two ports are open to foreign trade and the districts along the line, populous and fertile, produce a variety of products, construction is being expedited and is expected completed in the year 1913.

The Keijo-Gensan (Seoul-Wonsan) line starts from Ryuzan (Yongsan) on the Keijyo Fusan (Seoul-Fusan) trunk line and crossing the Kogen (Kangwon) Province, reaches the port of Gensan (Wonsan) in Kankyo (Hamkyung) Province. The line passes through mountainous districts and in consequence considerable difficulties are being encountered in the construction work. It is 136 miles in length and will be completed in the year 1914.

General Outline of the Lines.—All railway lines in Chosen are of the standard gauge, 4' 8-1/2", rails weighing 75 lbs. being chiefly employed. The lines are all of a single track with the exception of Fusan–Soryo section and the Yeitoho–Nandaimon section where a double track is laid. The heaviest grade on the Keijyo–Fusan (Seoul–Fusan) line is 1/50 and on the Keijyo–Shingishu (Seoul–New Wiju) line 1/40. The latter is now being reconstructed and the grade will be reduced to 1/100 in the near future.

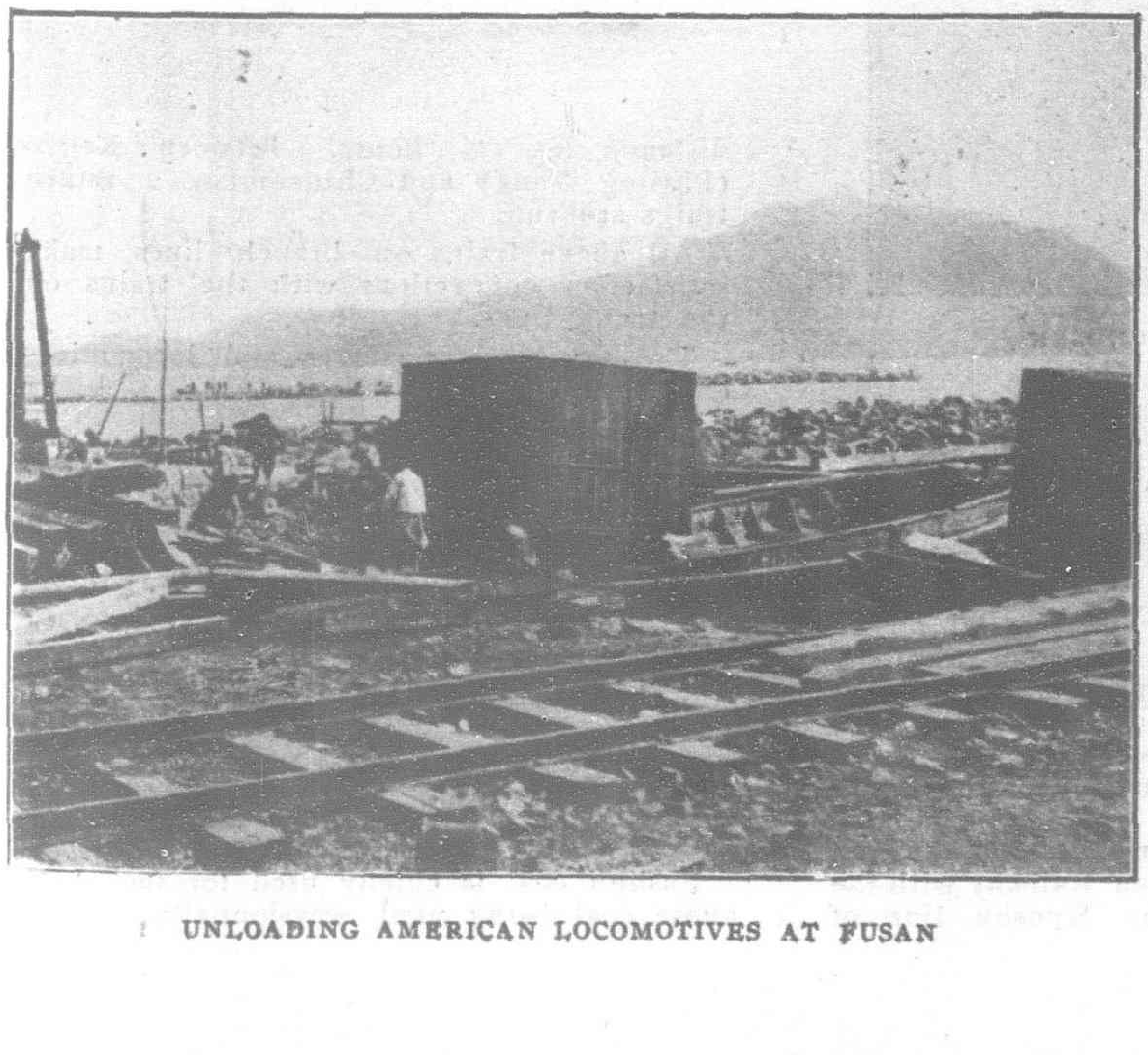
The curve of 15 chains in radius is the sharpest on the whole line and corridor trains of a bogie system hauled by locomotives of 100 tons or more are run on the Seoul–Fusan trunk line as well as on a portion of the Seoul–New Wiju line. However, locomotives of over 100 ton engines will shortly be operated on the whole line upon the completion of the reconstruction work.

The Shoken Tunnel measuring 3,948 ft. is the longest tunnel on the trunk line.

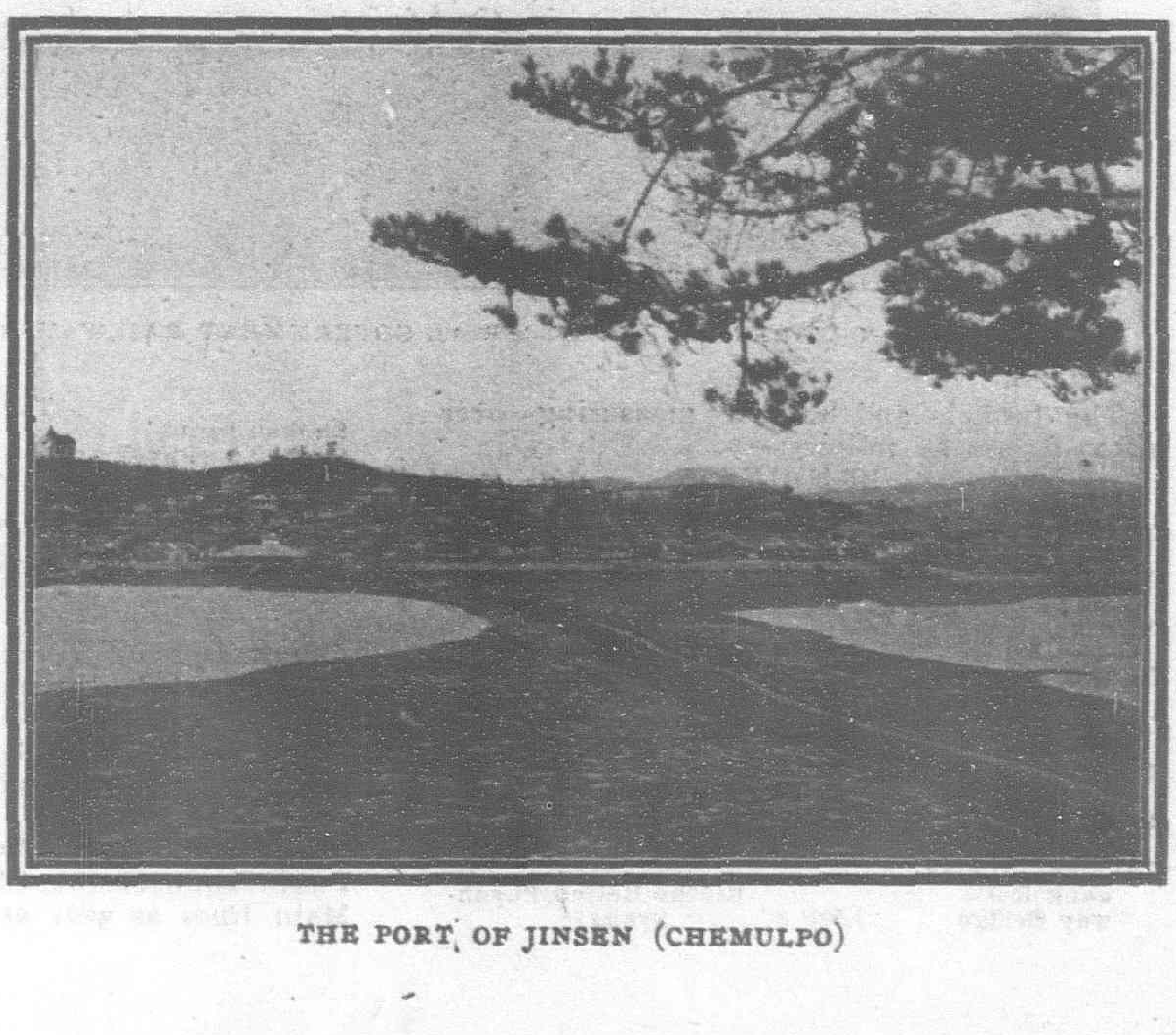
The Seisen River (Chyung-chyon-gang) railway bridge, measuring 2583 ft., is the longest bridge, but that over the River Yalu now under construction measures 3,100 ft. It is being built with a swinging span of 300 ft. at the middle part of the bridge to accommodate vessels. It will also be provided with footways on both sides of the bridge.

THE TRUNK LINES AND THEIR BRANCHES OF KOREAN RAILWAY

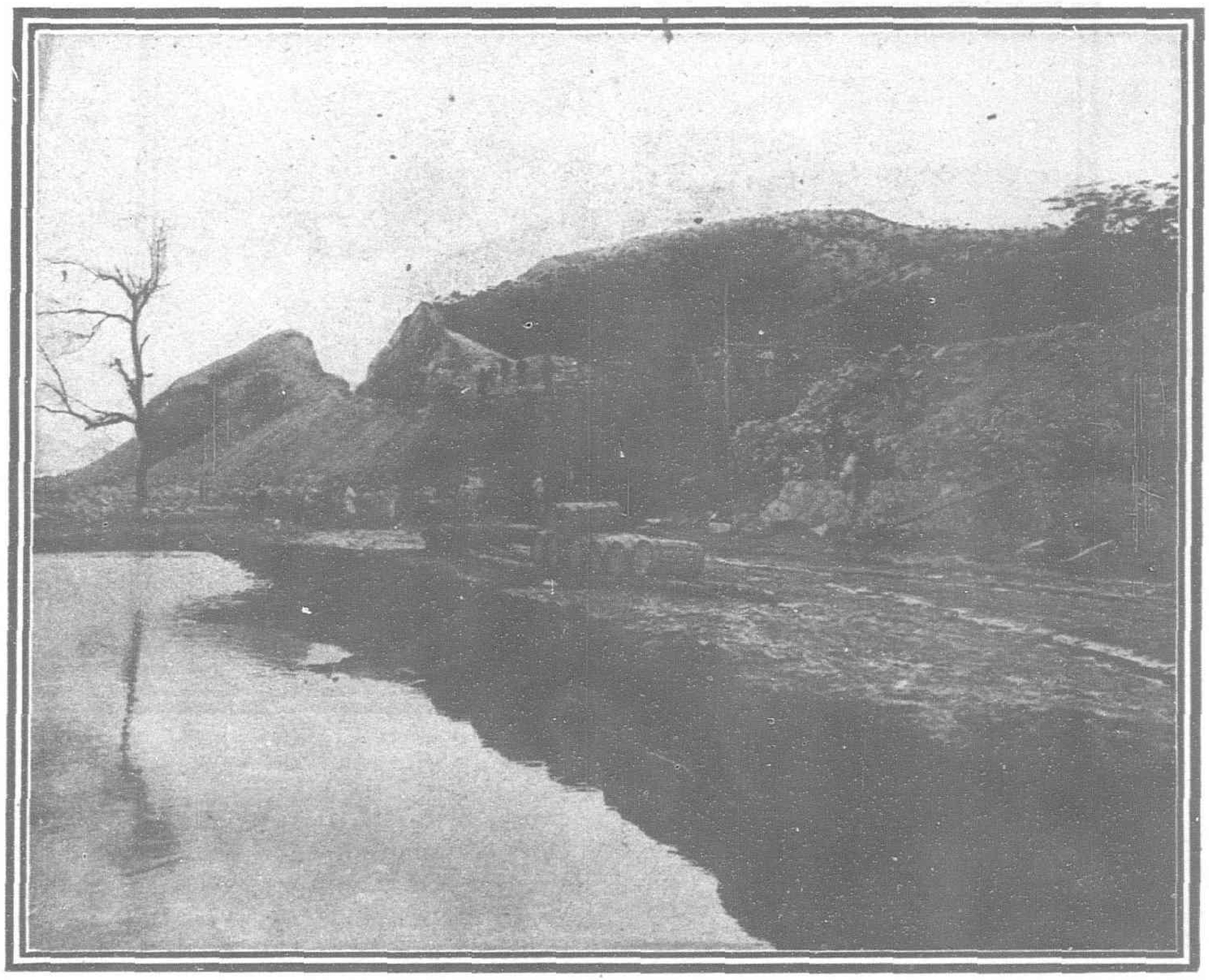
LINES OPEN TO TRAFFIC	KEIJYO-FUSAN (Seoul-Fusan) Line.	Keijyo-Fusan Trunk. Fusan-Seidaimon (Fusan-Seoul)	274.9
		Masan Branch. Sanroshin-Masan (Samaranjin-Masan)	24.8
		Jinsen Branch. Yeitoho-Jinsen (Yongdunpo-Chemulpo)	18.4
			318 1
	KEIJYO-SHINGISHU (Seoul-New Wiju) Line.	Keijyo-Shingishu Trunk. Ryuzan-Shingishu (Yongsan-New Wiju)	309 7
		Chinnampo Branch. Heijyo-Chinnanpo (Phyong Yang-Chinnampo)	34 3
		Kenjiho Branch. Koshu-Kenjiho (Hoangjyu-Keum E po)	8.9
		Hekirando Branch. Dojo-Hekirando (Tosong-Pyoklanto)	3.6
		(for goods only)	356.5
		TOTAL	674.6
LINES UNDER CONSTRUCTION	KONAN (Honan) Line	Taiden-Moppo. (Taichon-Mokpo)	161.0
		Gunsan Line. (Kunsan) Diverges at midway of the Taiden-Moppo Line	14.8
			175 8
	KEIJYO-GENSAN (Seoul-Wonsan) Line	Ryuzan-Gensan (Yongsan-Wonsan)	136.3
		TOTAL	312.1
		GRAND TOTAL	986.7



UNLOADING AMERICAN LOCOMOTIVES AT FUSAN

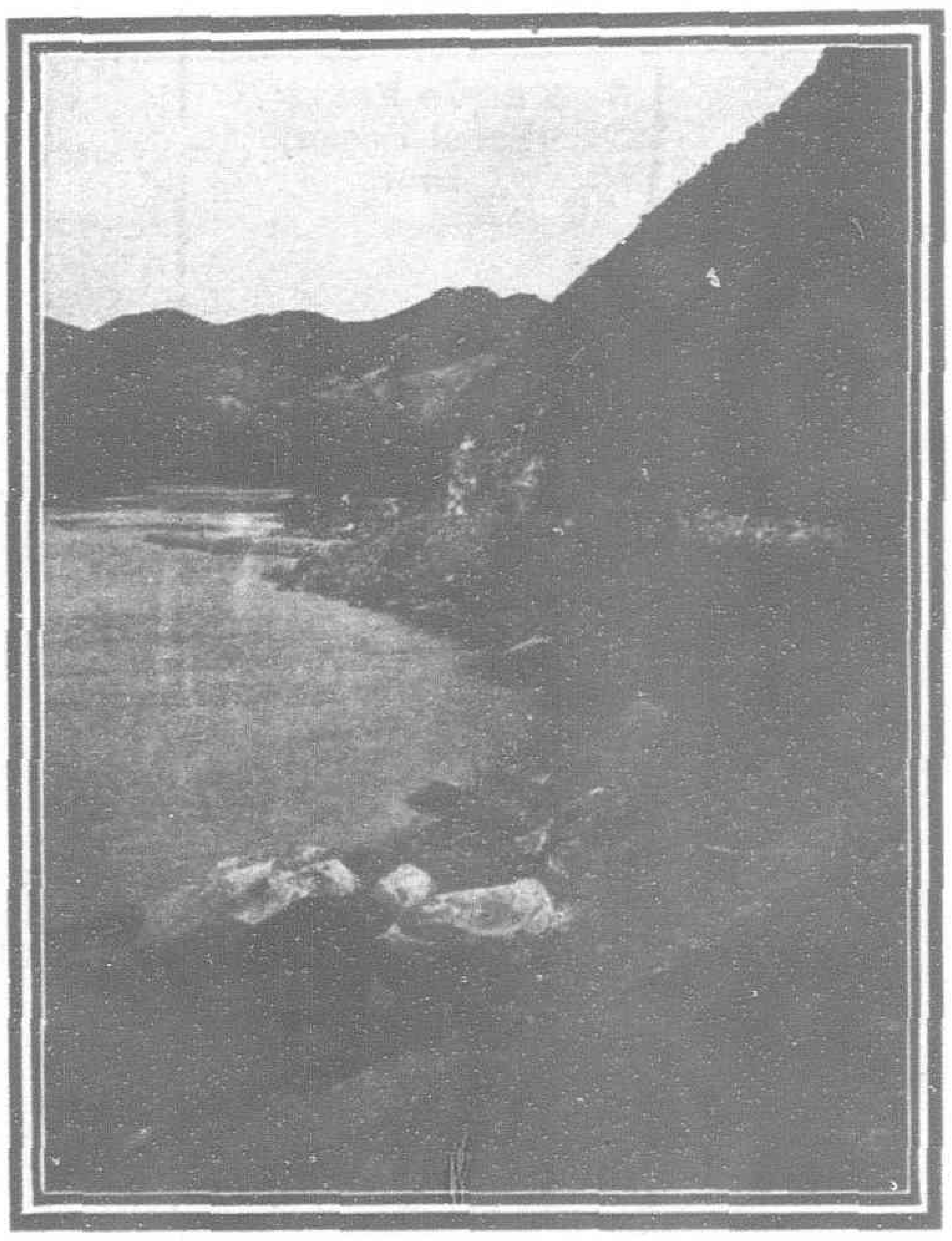


THE PORT OF JINSEN (CHEMULPO)



IMP. CHOSEN RAILWAYS: CONSTRUCTION WORK ON THE KEIGEN (SEOUL-WONSAN) LINE

FUSAN WORKS OF THE IMPERIAL GOVERNMENT RAILWAYS OF CHOSEN



IMP. CHOSEN RAILWAYS: CONSTRUCTION WORK ON THE KO-NAN (HONAN) LINE

The tunnels and bridges measuring over 1,500 ft. are as follows:—

BRIDGES.

NAME	LENGTH	POSITION
Chyong chyon-Gang Railway Bridge.	2,582' 6"	Shin an ju Reibi (Yong-mi)
2nd Han Gang Railway Bridge.	2,059' 3"	Noryangjin-Yongsan
Mitsuyo River Railway Bridge.	1,928' 8"	Mitsuyo (Milyang)-Yuchon.
Naktoko (Naktong-gang) Bridge	1,838' 3"	Nagtong Gan Chin Yong
Im jin gang Railway Bridge	1,786' 0"	Bunsan (Munsan)-Chyangdan.
Daineiko Railway Bridge	1,643' 6"	Shinan jyu-Reibi (Yong-mi).
Rakutoko (Nagtong) Railway Bridge	1,544' 11"	Waikan-Jakuboku.
Taidoko (Taidong-gang) Railway Bridge	1,501' 6"	Rikiho-Heijyo (Phyongyang)

TUNNELS

Shoken tunnel		
Shoken (Phyekma) Railway	3,948' 8"	Seido-Keisen.
Habuka (Phyekma) Railway	1,782' 0"	Hakuba-Sekika.
Gyoha Railway	1,740' 0"	Gyoha Shukusen.

General Outline of the Traffic Business.—Connections at Termini.—Beyond Shigishu (New Wi Ju), the north terminus of the trunk line, connection is made across the River Yalu by steam boats (by sleds in winter) with the Antung-Mukden line of the South Manchuria Railway. In the South, ferry steamers plying between Shimonoseki and Fusan connect the Chosen Railway with the Main lines as well as the Kyushu line of Japan. Between Jinsen and Dairen (Dalny) traffic is maintained by the liners of the Nippon Yusen Kaisha and the Osaka Shosen Kaisha—six times a month.

Joint traffic for passengers and parcels is managed between all stations on the Chosen Railway and the principal stations on the Imperial Japanese Government Railways as well as the South Manchuria Railway.

Train Services.—Between Fusan and Keijyo (Seoul), express trains are run daily from either direction and the distance is covered in about 9 hours. A dining car where European meals are served on the a la carte plan is attached to each of these. Between Keijyo and Shingishu, express trains are run once a day from each point and cover the distance in about 12 hours. European meals are also obtainable on these trains. Waiters and guides are provided for the benefit of passengers on all express trains. Besides, night trains start every other day from Keijyo to Fusan, or vice versa, the distance being covered in about 11 hours.

Between Keijyo and Jinsen (CHEMULPO), 18 through trains (including 4 express) are run daily, covering the distance of about 25 miles in 1½ hours (express trains take one hour). Between Sanroshin and Masan, trains run 4 returns a day and cover the distance in 1½ hours. Between Keijyo (Phyong Yang) and Chinnampo, 2 return trains are run.

All above trains on branch lines make satisfactory connections with the trains on the trunk lines.

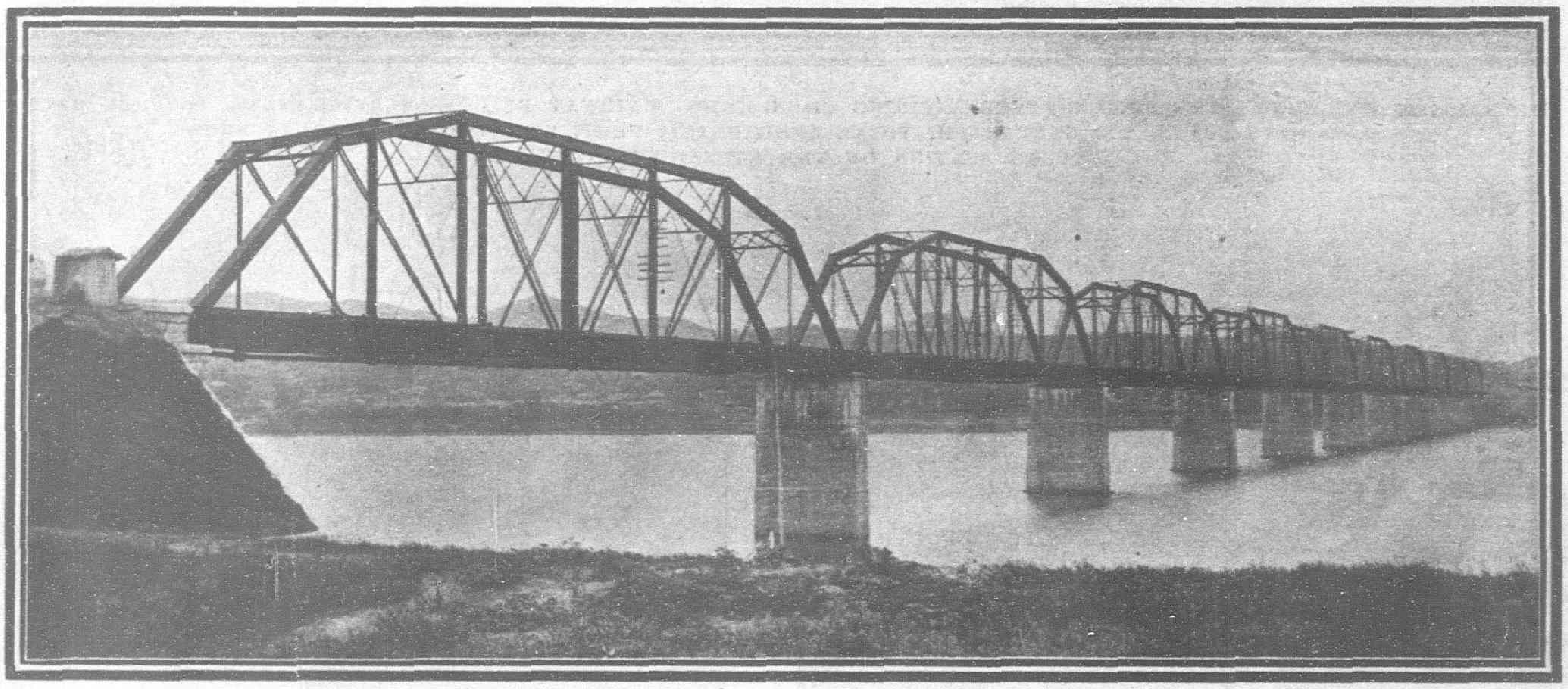
The number of carriages and locomotives employed is as [follows:—]

Locomotives......	118	tender engines	44
		tank engines	74
Carriages...........	165	(all bogie system)	
Wagons....................		26 ton wagon	485
		22 ,, ,,	305
		20 ,, ,,	50
		14 ,, ,,	4
		10 ,, ,,	342
			1186

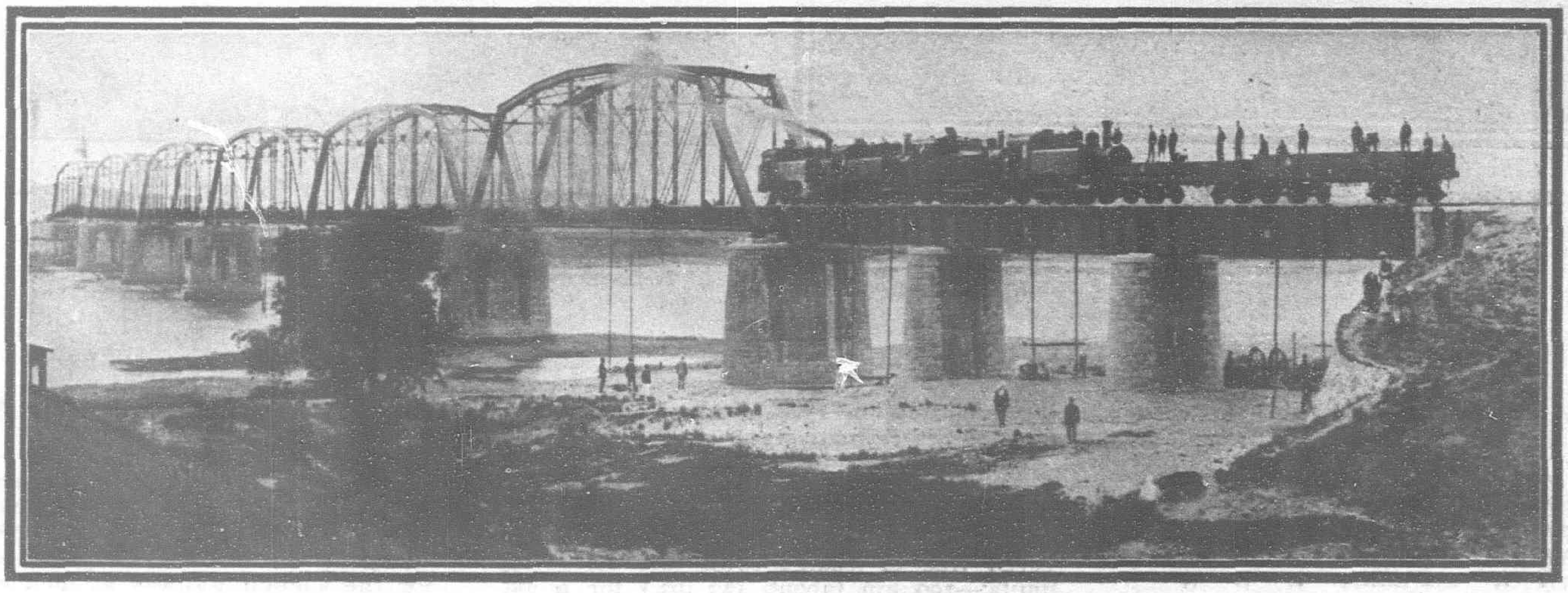
Fushun coal is chiefly used for fuel, Japanese coal being used occasionally.

A STREET IN SEOUL

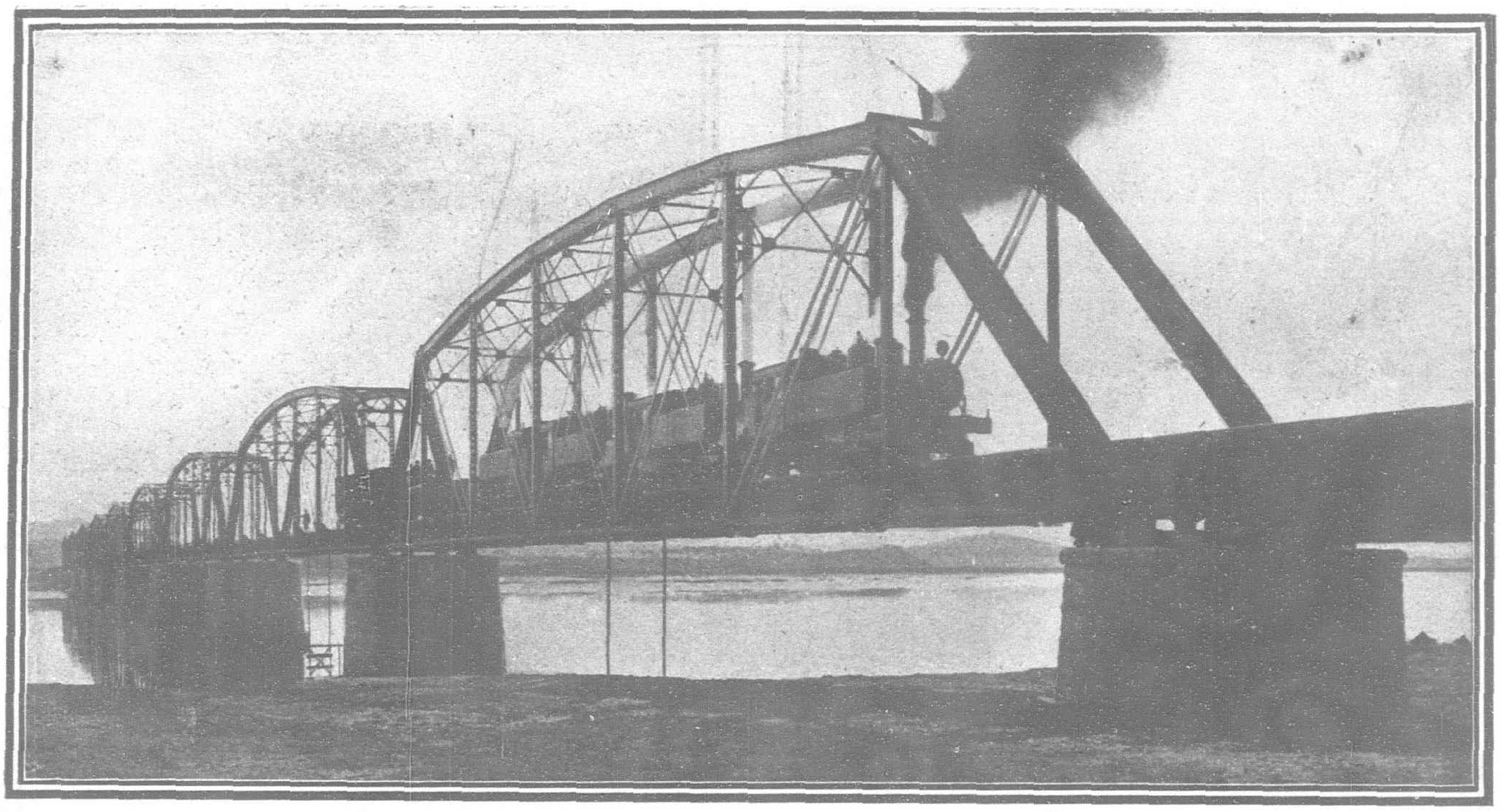
A GINSENG PLANTATION NEAR SEOUL



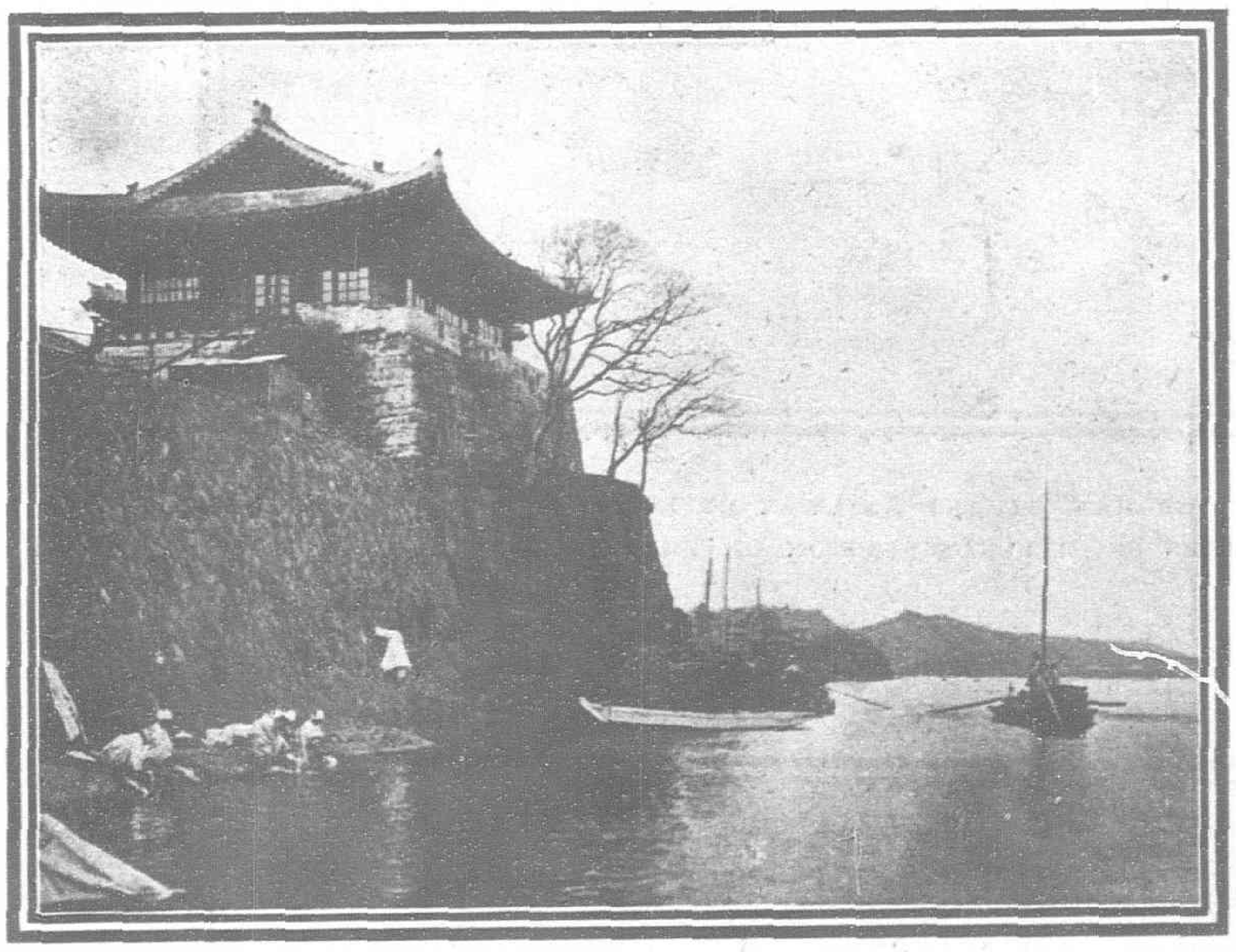
IMP. CHOSEN RAILWAYS.—THE SECOND KAN KOW (HANG KANG OR HAN RIVER) RAILWAY BRIDGE. TEN SPANS, 200 FEET LONG EACH, TOTAL LENGTH 2059 FEET, SITUATED 271.1 MILES FROM FUSAN STATION ON THE KEYJYO-FUSAN LINE.



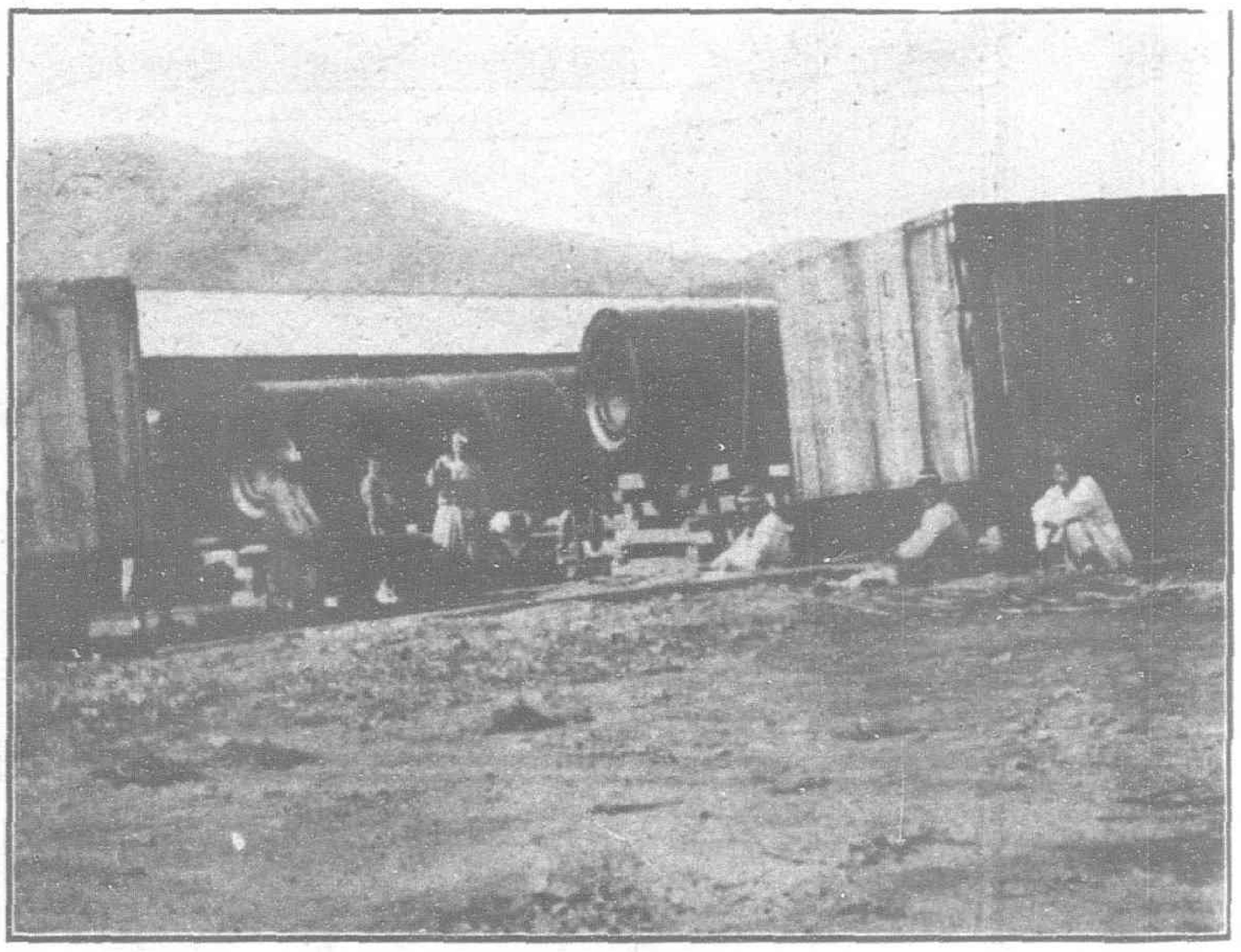
IMP. CHOSEN RAILWAYS.—THE FIRST DAI DO RIVER (TAITONG KANG) RAILWAY BRIDGE.—FOUR SPANS, 60 FEET EACH, AND SIX SPANS, 200 FEET EACH, TOTAL LENGTH 1,502 FEET, SITUATED 161.27 MILES FROM RYUZAN STATION ON THE RYUZAN-SHINGISHU LINE.



IMP. CHOSEN RAILWAYS.—THE SEISEN RIVER—(CHUNG CHUN KANG) RAILWAY BRIDGE—ELEVEN SPANS, 60 FEET EACH, AND NINE SPANS, 200 FEET EACH, TOTAL LENGTH 2583 FEET, SITUATED 211.13 MILES FROM RYUZAN STATION ON THE RYUZAN-SHIN-GISHI LINE.



IMP. CHOSEN RAILWAYS.—THE RENKOTEI; AN ANCIENT TOWER AT HEIJYO (PYONG-YANG)



UNLOADING AMERICAN LOCOMOTIVES AT FUSAN.

FARE AND FREIGHT.—FARE BASIS.

(3rd class)

Up to 50 mile	3	sen per mile.
51-100 miles	2½	sen per mile.
101-200 ,,	2	,, ,, ,,
201-300 ,,	1½	,, ,, ,,
over 301 ,,	1	,, ,, ,,

Computation of the fare will be made separately for each distance above mentioned and aggregated.

1st and 2nd class tickets are sold at the increased rate of 150% and 75% of a 3rd class ticket respectively.

For passengers in party, a reduction of fares is allowed according to their number and the distance they travel.

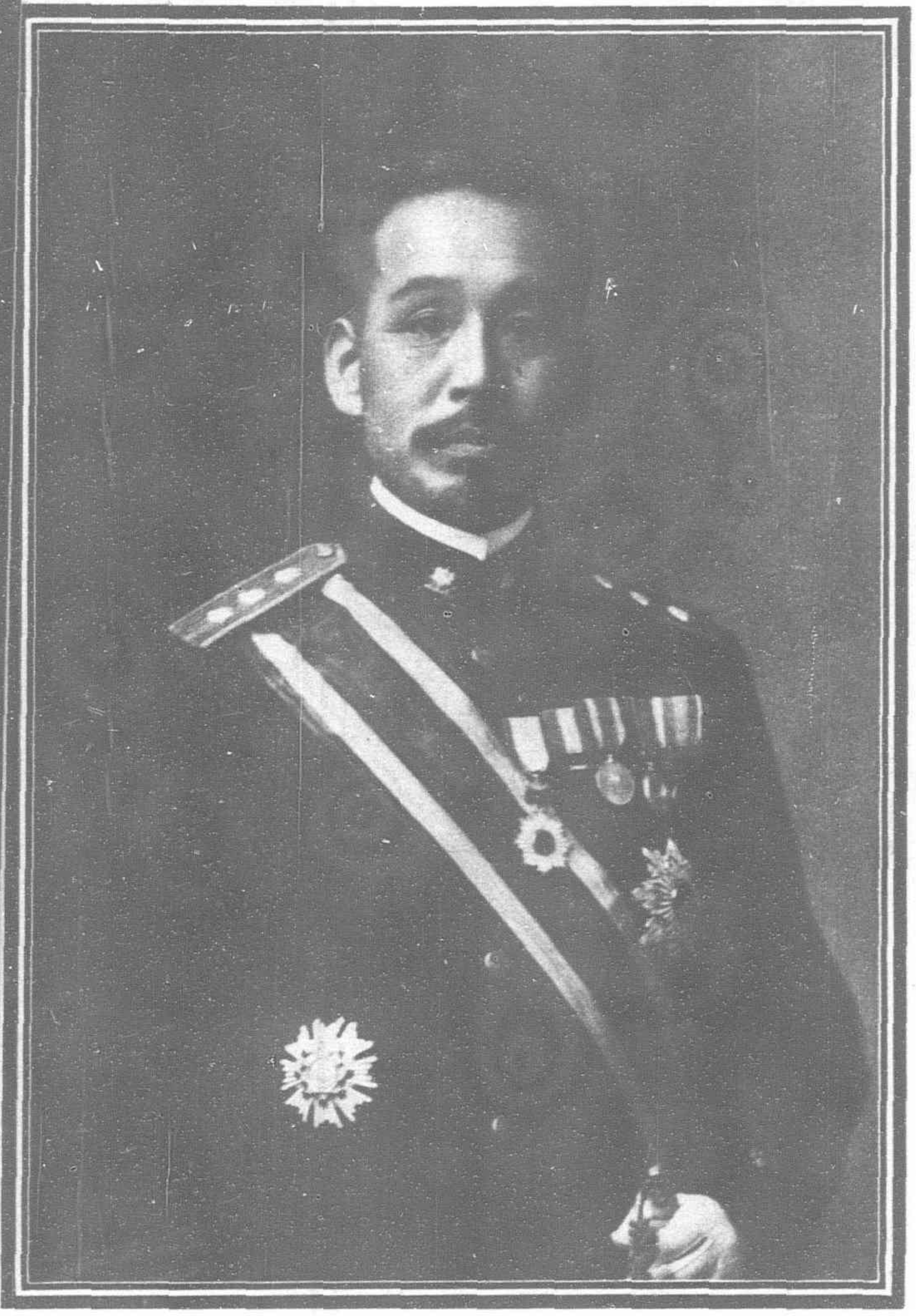
Luggage conveyed free.—Luggage is conveyed free of charge with the following limits:—100 kin (about 133 lbs.) for a 1st class passenger; 60 kin (about 80 lbs.) for a 2nd class passenger; 30 kin (about 40 lbs.) for a 3rd class passenger.

Children up to four years of age are free of charge, and those over four and under twelve are charged half fare.

Agents for the sale of tickets.—The Railway Bureau is now under agreement with Messrs. Thomas Cook & Son and the International Sleeping Car & Express Train Company for the sale of passenger tickets for the Chosen Railway at their agencies in Japan, China, and other parts in the Far East as well as in Western Countries.

Freight Basis.—The freights for wagon goods are as follows:

POST OFFICE AND POSTAL ROUTE IN KOREA
31ST MARCH, 1909
MANCHURIA.
CHIENTAO
NORTH-HAM-GYONG
SOUTH-HAM-GYONG
NORTH-PHYONG-AN
SOUTH-PHYONG-AN
HOANG-HAI
KANG-UON.
KYONG-GEUL
NORTH-CHUNG-CHYONG
SOUTH-CHUNG-CHYONG
NORTH-KYONGSYANG.
SOUTH-KYONGSYANG.
NORTH-CHOLLA.
SOUTH-CHOLLA.
SOUTH-CHOLLADO
CHONG-JIN
MUSAN
PURYONG
KYUNGSUNG
HYUNGCHYUN
SUNGJIN
TANCHYUN
PUKCHONG
HAMHEUNG
KAPSAN
HEYISANCHIN
CHANGJIN
KANGGEH
CHOSAN
CHANGSU
CHUNGGANGCHIN
CHASUNG
HUCHANG
WIJU
SHIN-WIJU
UNSAN GOLD MINE
HUICHYUN
YUNGBYUN
PAKCHYUN
SUNCHYUN
CHYUNGJU
TOKCHYUN
KAICHYUN
SHUNCHYUN
SHUNAN
PYING-YANG
YONGHEUNG
YANGDOK
WONSAN
CHINNAMPO
KANGSU
WHANGJU
CHUNGHWA
KOKSAN
CHAIRYONG
EURYUL
CHANGYUN
SHINGEH
HAIJU
ONGCHIN
ICHYUN
PYUNGSAN
KAISUNG
CHANGDAN
MUNSAN
YANGJU
POCHYUN
KIMWHA
CHUNCHYUN
HONGCHYUN
YANGGU
YANGYANG
KANEUNG
KANGNEUNG
SAMCHYOK
WONJU
PYONGCHANG
SEOUL.
CHEMULPO
KWANJU
LICHYUN
CHINWI
SUWON
CHUNGJU
CHUNCHYUN
CHINCHYUN
KONGJU
CHUNAN
YESAN
HONGJU
SUSAN
CHUNGJU
YUNGCHYUN
POEUN
SANGJU
ANDONG
YUNGCHUN
HUNGUNG
YECHYUN
WOLCHYUN
TUNGSOK
KIMCHYUN
SUNSAN
KUNWI
YUNGDONG
TAIKU
YONGCHYUN
POHANG
KYUNGJU
CHAIN
CHANGNYUNG
MILYANG
URUSAN
KIMHAI
MASAMPO
FUSAN
KUNSAN
KIMCHE
CHINAN
KOCHANG
NAMWON
TAIIN
KOBU
CHANGSUNG
SUNCHANG
KWANGJU
NAJU
SUNCHON
HADONG
CHINJU
KOSUNG
KURCHEM
MOKPO
YUNGAM
CHANGHEUNG
HAINAM
CHINDO
WANDO
HEUNGYANG
YOSU
CHEMJU
Chehju Isl.
Quelpart Isl. (Hamilton Isl.)
Ullung Isl.
SOUTH-KYUNGSANGDO
TO JAPAN
TO CHINA
TO VLADIWOSTOCK
124° 125° 126° 127° 128° 129° 130° 131°
34 35 36 37 38 39 40 41 42 43
BUREAU OF COMMUNICATIONS OF THE RESIDENCY GENERAL.
1ST CLASS POST OFFICE.
2ND CLASS POST OFFICE.
3RD CLASS POST OFFICE.
3RD CLASS POST OFFICE IN FISHING VESSEL.
POST STATION.
LOCOMOTIVE RAILWAY POSTAL ROUTE.
POSTAL ROUTE (BY ROAD).
MARITIME POSTAL ROUTE.
TROCK RAILWAY POSTAL ROUTE.
POSTAL DISTRICT BELONGING TO 1ST CLASS POST OFFICE.
NUMBER OF POST OFFICES.
1ST CLASS POST OFFICE 8
2ND CLASS POST OFFICE 162
3RD CLASS POST OFFICE 81
POST STATION 158
LENGTH OF ROUTES.
RAILWAY POSTAL ROUTE .... 607 (mile)
TROCK RAILWAY POSTAL ROUTE .... 68 (mile)
MARITIME POSTAL ROUTE .... 10524 (knot)
POSTAL ROUTE (BY ROAD) .... 2467 (ri)



H. E. GOMPEI OYA, KOGAKUHAKUSHI

Director General of the Railway Bureau of the Government General of Chosen.

FREIGHT RATES

			Freight				Over	
Class	*Goods*	*Unit*	*0-20 m.*	*21-50 m.*	*51-100 m.*	*101-200 m.*	*201 m.*	*Min.*
goods dealt in kin....	....	100 kin per 1 m.	9 rin	4 rin	4 rin	2 rin	1 rin	9 sen
goods dealt in ton....	....	1 ton per 1 m.	5 sen	4 sen	3 sen	2 sen	1 sen	50 sen
animal.....	ox, horse	1 head per 1 m.	10 sen	8 sen	6 sen	4 sen	2 sen	4 yen
animal.....	pony, calf, sheep, pig.	,, ,, ,, ,,	5 sen	4 sen	3 sen	2 sen	1 sen	4 yen

10 rin—1 sen 100 sen—1 yen 1 kin—1.333 lbs.

Computation of freight will be made separately for each distance above mentioned and aggregated.

A special reduction will be made according to the distance to be conveyed and the nature of goods.

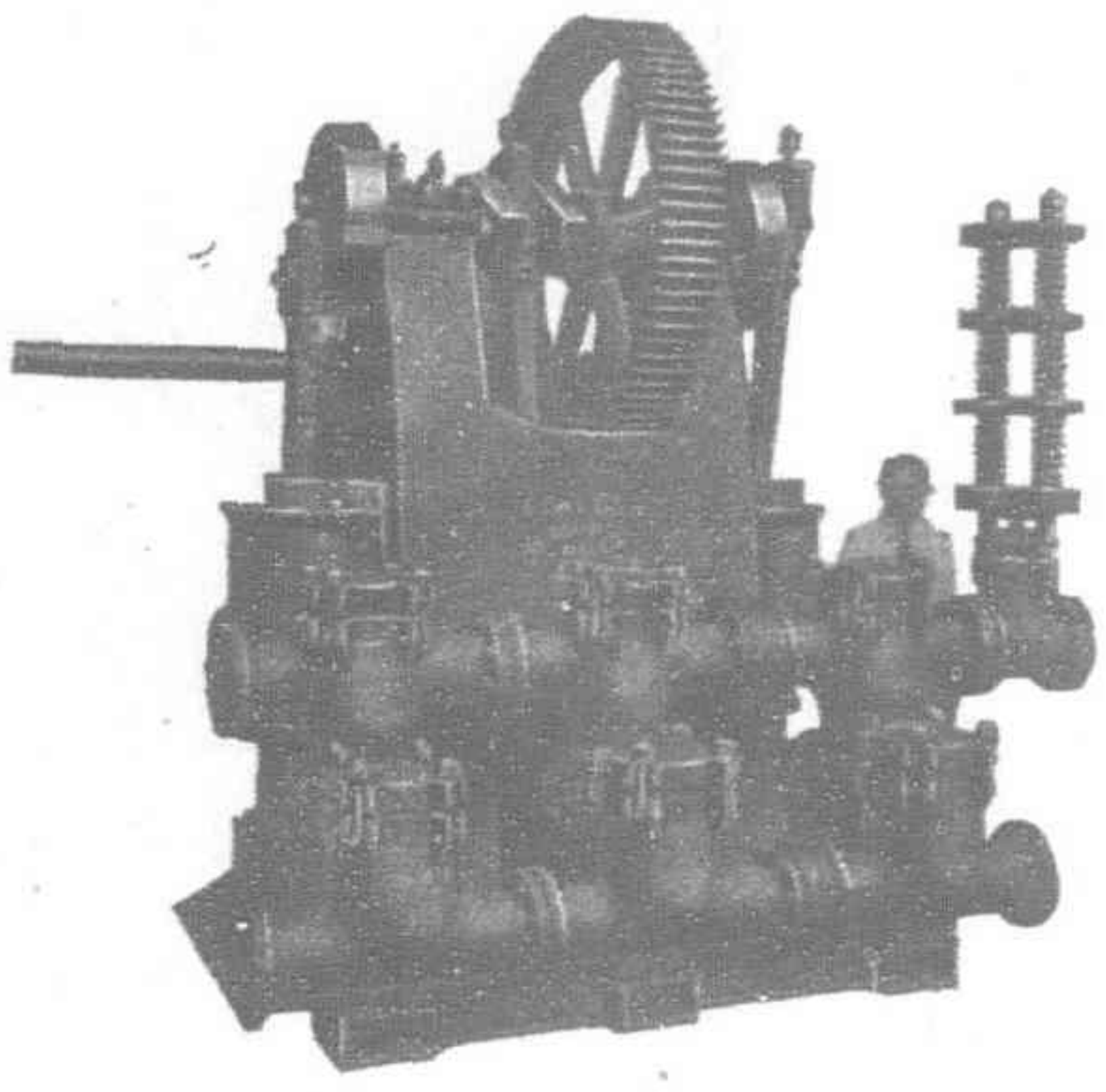
TRAFFIC BUSINESS.—The following table shows both the number of passengers and the tonnage of goods conveyed during the last three years and the receipt:—

Fiscal year	1907	1908	1909	1910
Receipt........	3,262,686	3,956,854	3,817,304	4,562,904
Number of Passengers.......	2,625,772	2,172,741	1,930,442	2,024,490
Tonnage of goods........	391,175	737,698	712,137	888,723
Receipt per day per mile.....	yen13 942	yen16.899	yen16.326	yen19.060

Mechanical Enterprise.—Three workshops are in existence at Soryo, Ryuzan and Kenjiho and meet the requirements for manufacturing and repairing the rolling stock, machinery, tools, etc. The Ryuzan Shop covering an area of about 3,700 tsubo (1 tsubo—6 ft. square), is the largest of the three and the artisans and workmen (both Japanese and Korean) employed in the shop number 700. Besides supplying railway materials, orders from the general public for the manufacture and repair of machines and machinery are executed by all the shops. The motive power used is generally steam but in Ryuzan Workshop electricity in addition to steam is employed.

NEW GOULDS SINGLE-ACTING TRIPLEX PLUNGER PUMP FOR HIGH PRESSURES 215 TO 1500 POUNDS.

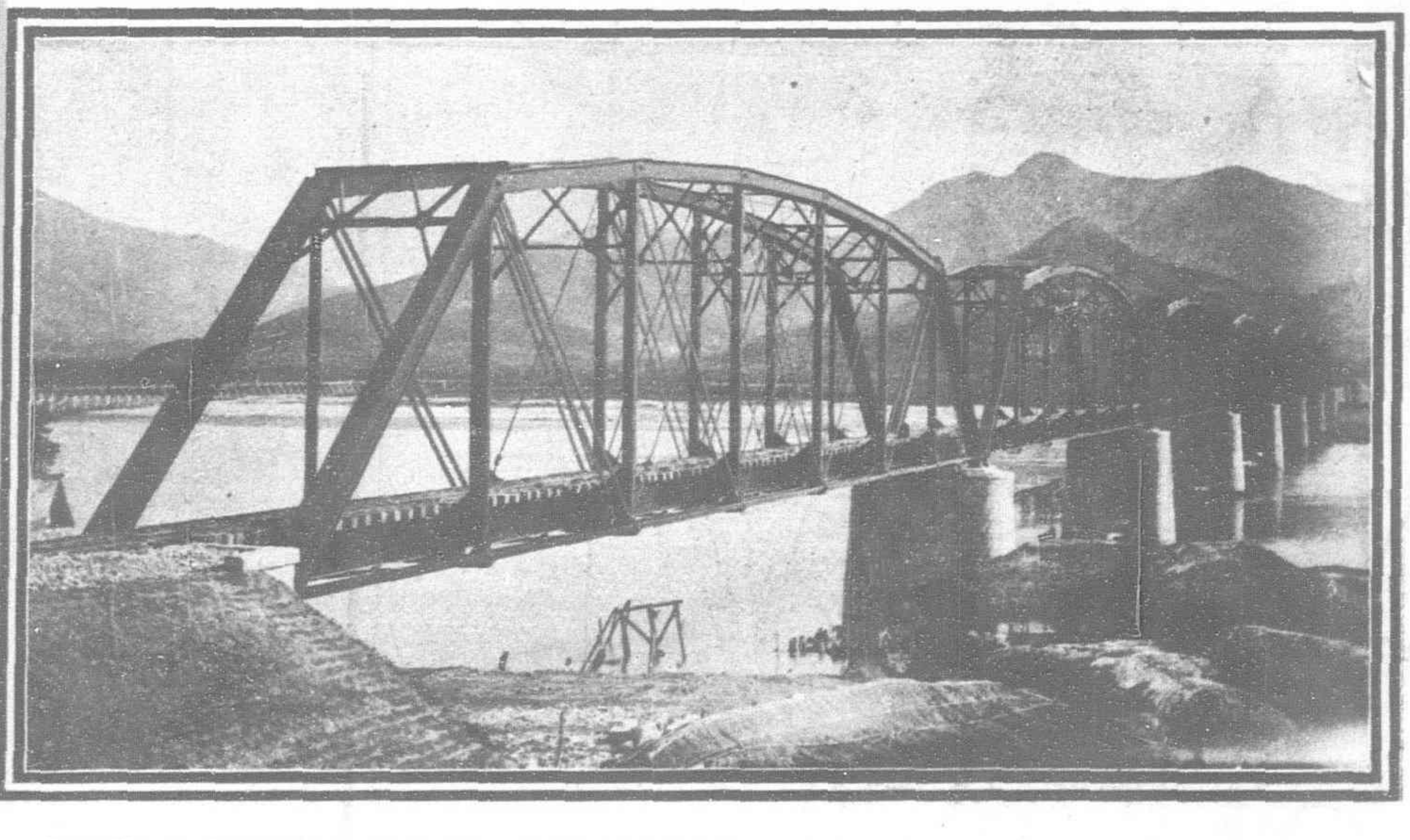
The Goulds Manufacturing Company, Seneca Falls, N. Y., have just placed a new high pressure Triplex Power Pump on the market. This pump, known as Fig. 1585, is similar to the Fig. 1283 type, which is in general use in mines, water works, and with hydraulic elevators, fire protection systems, hydraulic presses, oil pipe lines, etc.



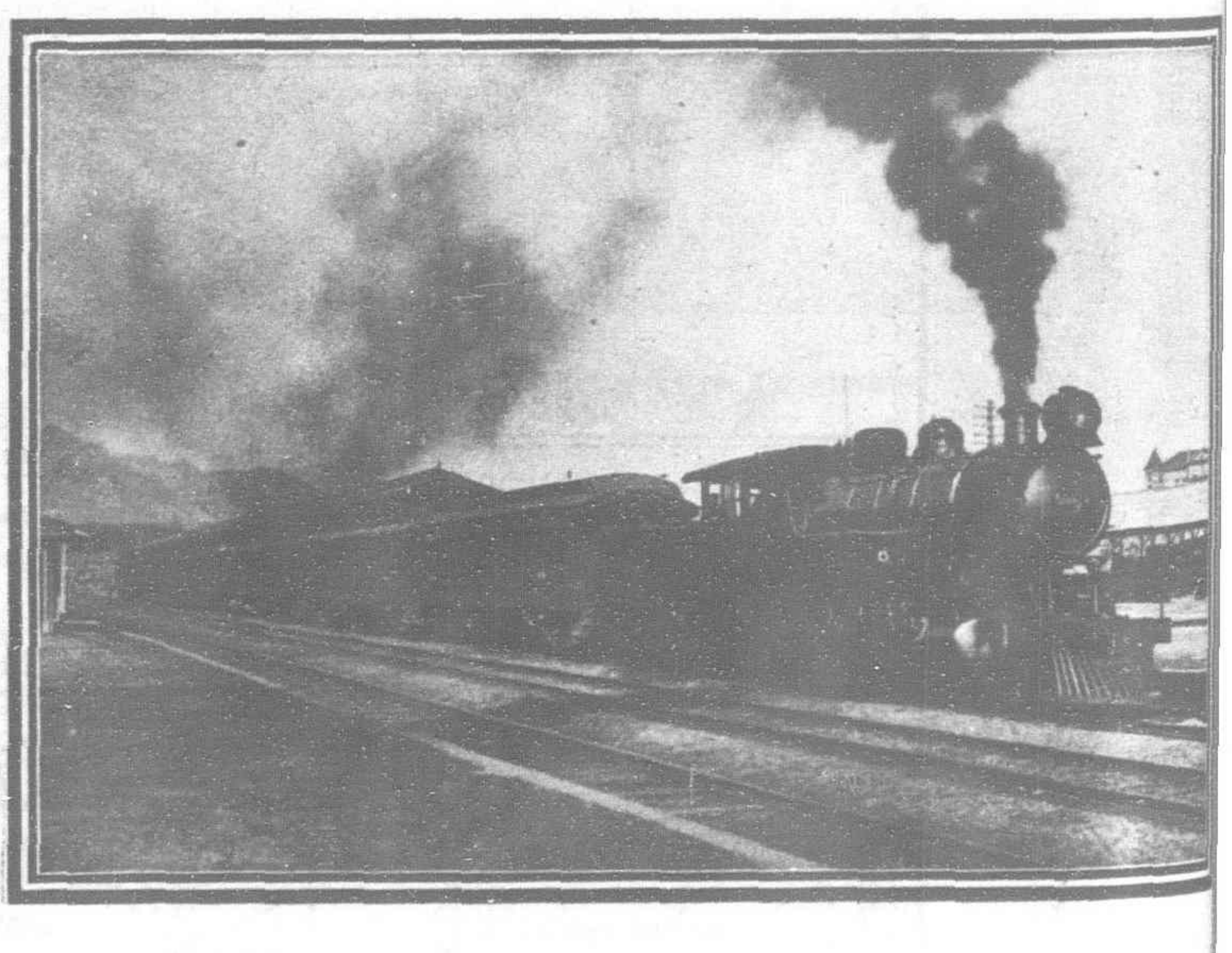
The chief difference is in the gearing. As shown by the illustration, the new pump has only one gear and pinion, which are located between the standards. Figure 1283 had two sets, one on either side of the standards.

Placing the gearing between the standards necessarily lengthened one side of the pump somewhat, and increased the distance between the two valve boxes on that side. Instead of lengthening the pipe connection between the valve boxes on one set and making each set of a different shape as they are in many pumps, a distance piece is put in as shown. In this way the three sets of valve boxes are kept identical in form and interchangeable.

This duplication of parts is a feature of Goulds Pumps, which is greatly appreciated by the purchaser, and one that saves valuable time when repairs are needed. It also reduces the number of parts kept in stock by the large user who may be located at a great distance from the factory.



IMPERIAL CHOSEN RAILWAYS.—THE RAKUTO RIVER (NOKTONG KANG) RAILWAY BRIDGE ON THE MASAN BRANCH LINE.—SIX SPANS, 60 FEET EACH, AND SEVEN SPANS, 200 FEET EACH, TOTAL LENGTH 1838 FEET, SITUATED 22 83 MILES FROM MASAN STATION ON THE MASAN BRANCH LINE



IMPERIAL CHOSEN RAILWAYS.—THE SEOUL-FUSAN EXPRESS

OPENING OF THE CHINESE SECTION, CANTON-KOWLOON RAILWAY

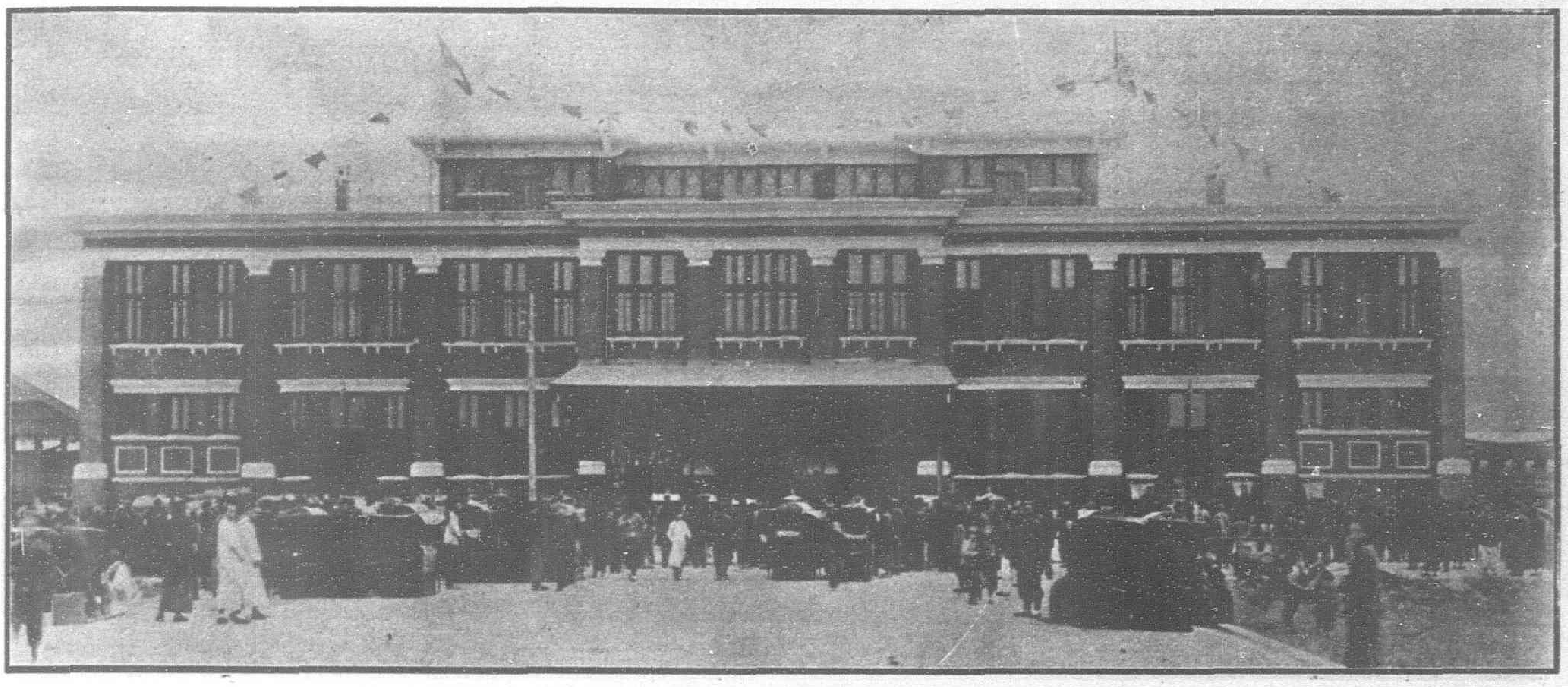
An official luncheon at the station at Sam Chun at the boundary of British and Chinese territory British and Chinese officials participating, at noon, October 4, celebrated the completion of the Chinese Section of the Canton–Kowloon Railway and inaugurated a through service between Kowloon and Canton.

An official train from Canton with the Chinese railway officials and their guests left Canton at 8:45 a. m. arriving at Sam Chun at 12:20, a total distance of 98 miles.

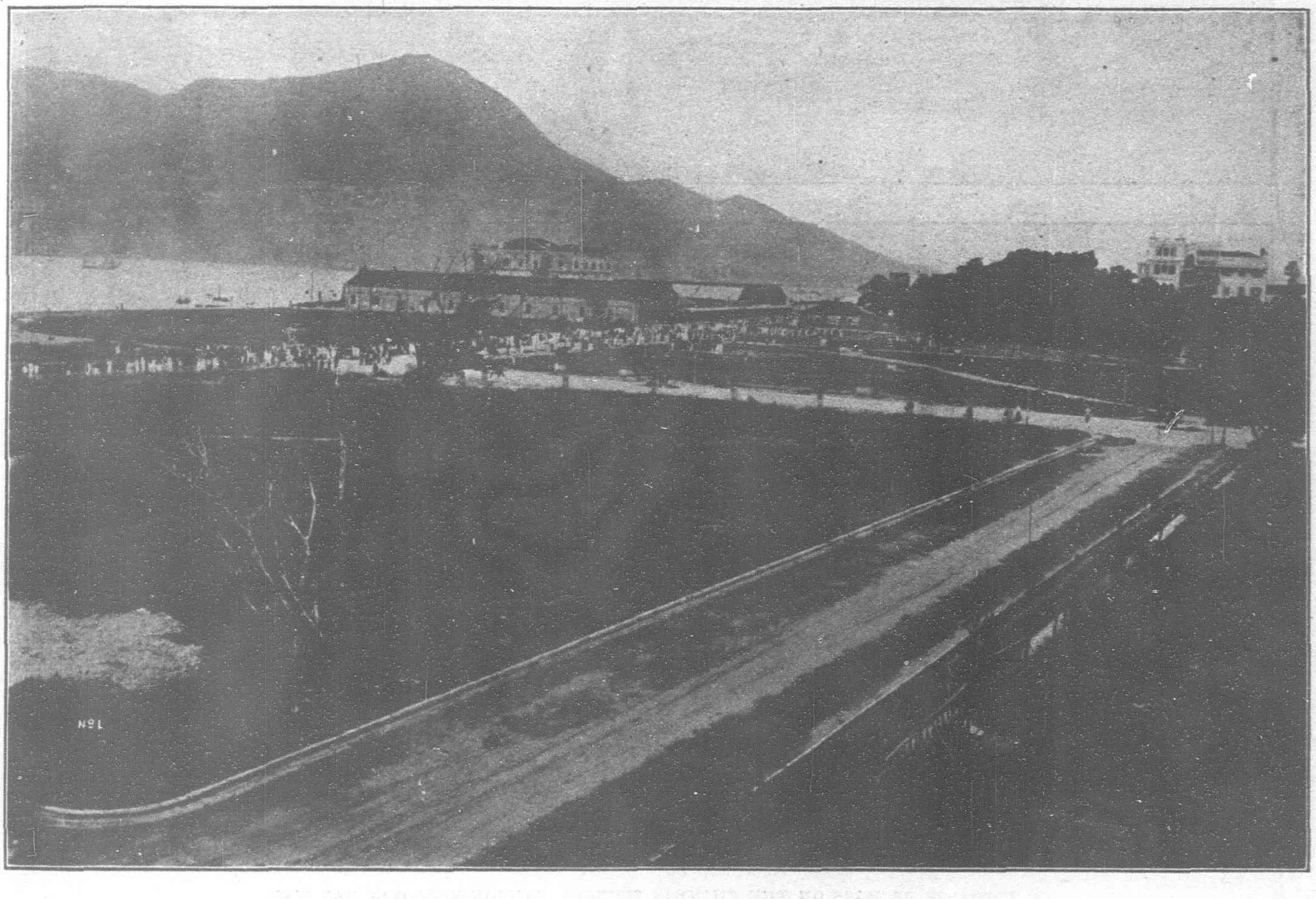
Another special carrying the guests of the railway from Hongkong arrived at Sam Chun about the same time.

H. E. Li Ching Feng, Commissioner of Foreign Affairs, in proposing the toast "Success to the Canton-Kowloon Railway: British and Chinese sections" concluded his remarks by officially declaring the two sections connected and open for traffic.

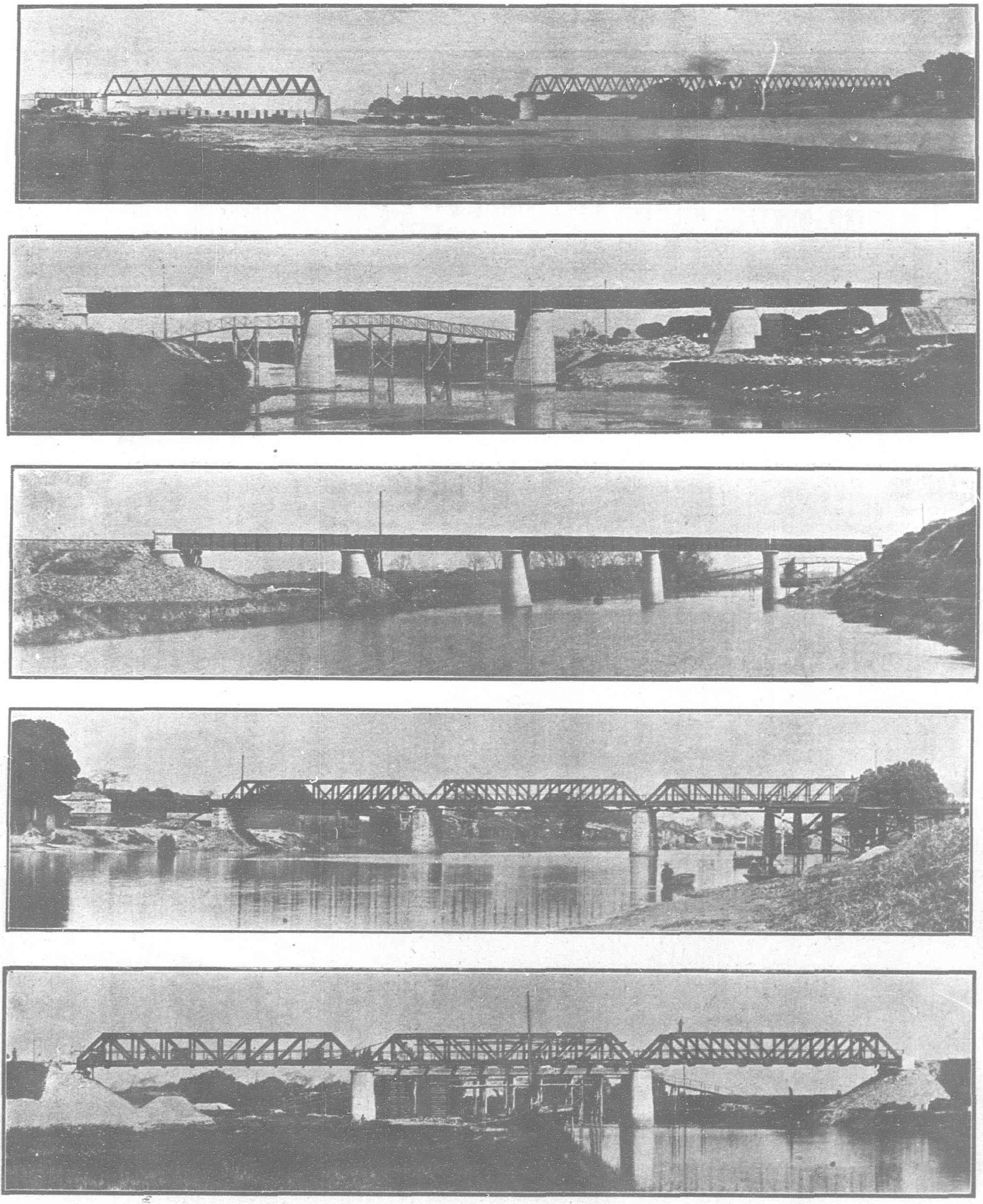
In response the Hon. Warren B. Barnes, Colonial Secretary of Hongkong, stated that the occasion was one in celebration of the success of Anglo-Chinese co-operation and referred to the satisfactory conclusion of a working agreement for the two sections. He expressed belief that the line would pay from the start. Local traffic alone would, he believed, cover operating expenses and a fair sum towards interest on capital while as



CANTON-KOWLOON RAILWAY.—TAI SHA TOU (CANTON) STATION



THE KOWLOON TERMINAL OF THE BRITISH SECTION



TYPES OF BRIDGES ON THE CHINESE SECTION, CANTON-KOWLOON RAILWAY

the long distance traffic developed with the lines proposed towards Peking the revenues would steadily increase. He said:

"I anticipate in the next five years, passing through Samchun with a ticket in my pocket for London, and a return ticket at that."

His Honor Chao Ching Hua, Managing Director of the Imperial Chinese Section of the Canton-Kowloon Railway, stated that the function marked the strengthening of the close friendship between China and England. He paid a tribute to his predecessor and expressed his appreciation of the services of the local authorities, foreign and Chinese staffs. He also made special reference to the splendid services of Mr. Frank Grove, Engineer-in-Chief.

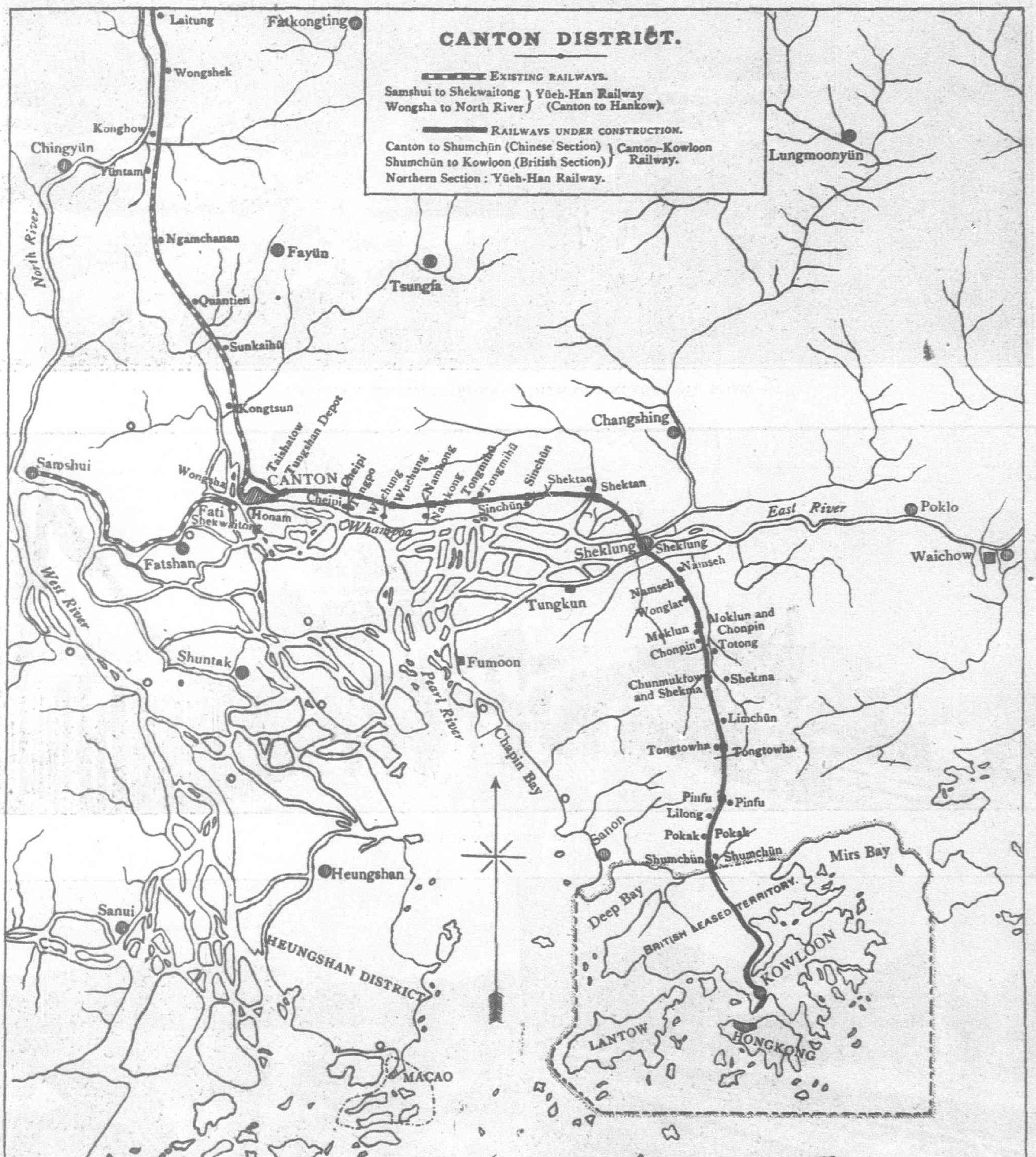
Mr. E. S. Lindsay, Chief Resident Engineer of the British section, was optimistic as to the future of the line. He said:

"It is just a year since the British section was opened for traffic and the fact that the result of the past year has greatly exceeded our expectations may be taken as a happy augury of success in the future. If a line 22 miles in length running from Kowloon to Lowu, nowhere in particular, and passing through a thickly populated district of the New Territory can earn enough to almost pay its fair working expenses during the first year's operation, what possibilities must there lie before a line five times as long connecting two centers such as Hongkong and Canton and passing through a province whose average population is 450 to the square mile?" He also referred to the promise of increased traffic as the Canton-Hankow and branches were completed. He expected that the distance between Honkong and Canton would soon be made in four hours.

Mr. Frank Grove, Engineer-in-Chief, who has been identified with the Chinese section since its inception and to whom credit is due for the high standard construction and the expedition with which the line was built, was the next speaker. In reviewing the history of the road he said:

"The survey commenced in August of 1907. Land purchase commenced early in 1908 and construction of works may be taken to date from June of 1908. We have, therefore, taken 3 years and 3 months to build this Railway, or, adding the first few months of survey, just a little over four years altogether. I do not claim that there is much, if any, credit attached to this length of time. One would have liked to say three years instead of four years. Things move slowly in China; but I do claim that the work has been pushed forward continuously, energetically and successfully on the different districts and that many physical and engineering difficulties have been overcome.

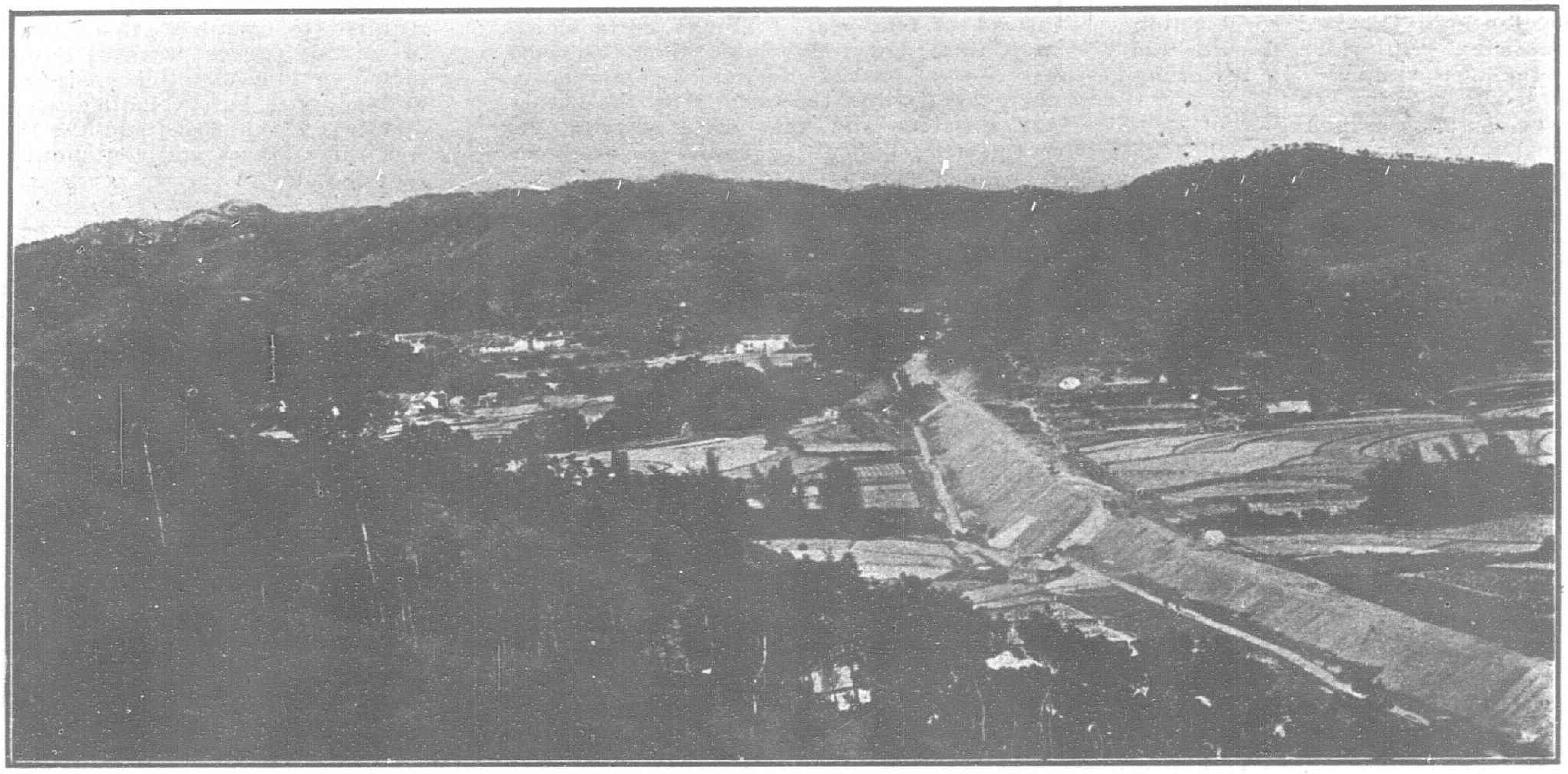
"It generally falls to the lot of an Engineer-in-Chief to defend the cost of the railway he builds, but this railway is in the happy position of having been spared criticism and, therefore, I can approach the subject in a light spirit. In September, 1908, I produced, as a result of the detailed survey, an estimate of cost and length of time probably required to complete this line; the former in round figures was 12½ million dollars, including administration charges, police, cost of land, etc., but excluding the interest and service on the loan; and the time I named was three years and ten months, the date for completion being given as June 1911.



Canton Trade Report, 1908.

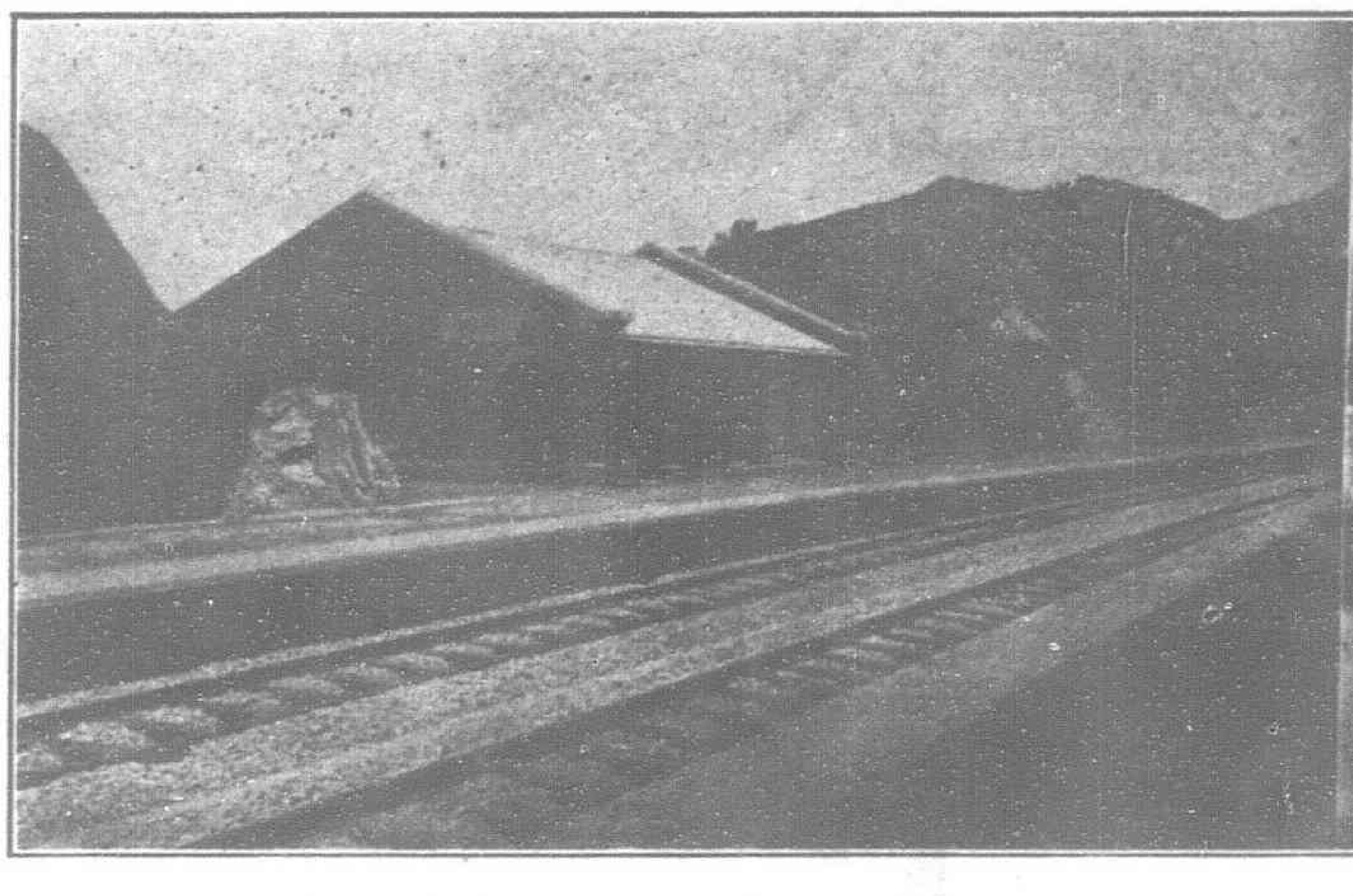
We have taken a few months longer to complete the line, but the cost will be within the limits of my estimate. (Applause.) This, gentlemen, is, I believe, a satisfactory condition of things, but it has been attained only by the active and loyal help of all departments.

"Some of the heaviest work has been carried out by engineers unfortunately not present to-day. May I mention Mr. Boothby, who had charge of the East River Bridge section; Mr. Fraser, who made an excellent location of the line from Mile 50 to Mile 89, mostly through difficult and hilly country. Mr. Moore is still with us, fortunately. He has successively had charge of No. 1 and No. 3 Districts and has done excellent work on each. I must also specially mention Mr. Thompson, who is so proud of his locomotives and rolling stock; Mr. Hall, our active Chief Accountant; and Mr. Fischer, whose store department has always been kept in good order. I wish I had time to give more references to our staff, but time forbids. But we have been fortunate in both foreign and Chinese staff, and that means everything for economy and efficiency. (Hear, hear.)

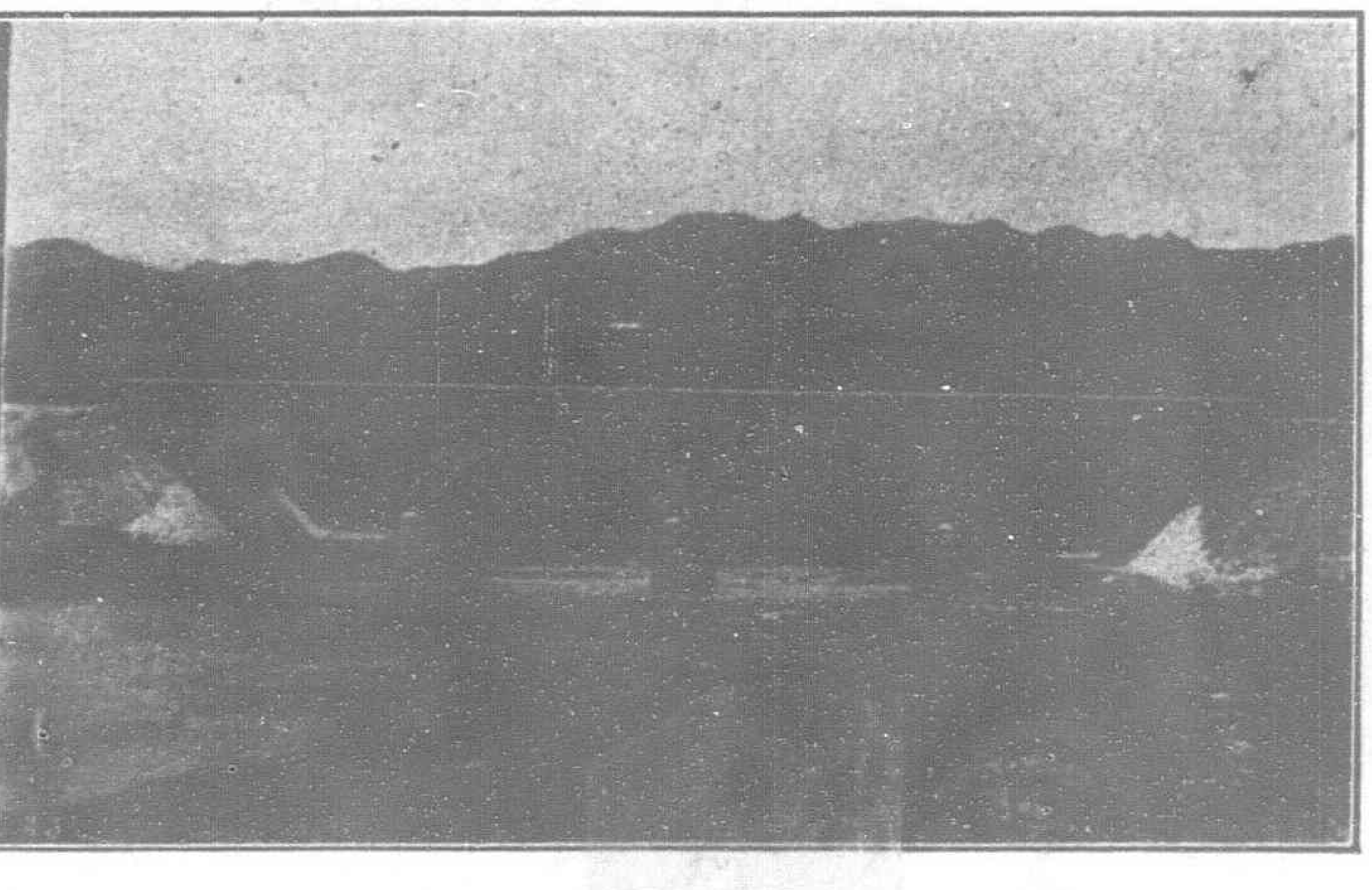


MILE 83, LOOKING NORTH, CANTON-KOWLOON RAILWAY.

TAI SHA TPU STATION (CANTON).



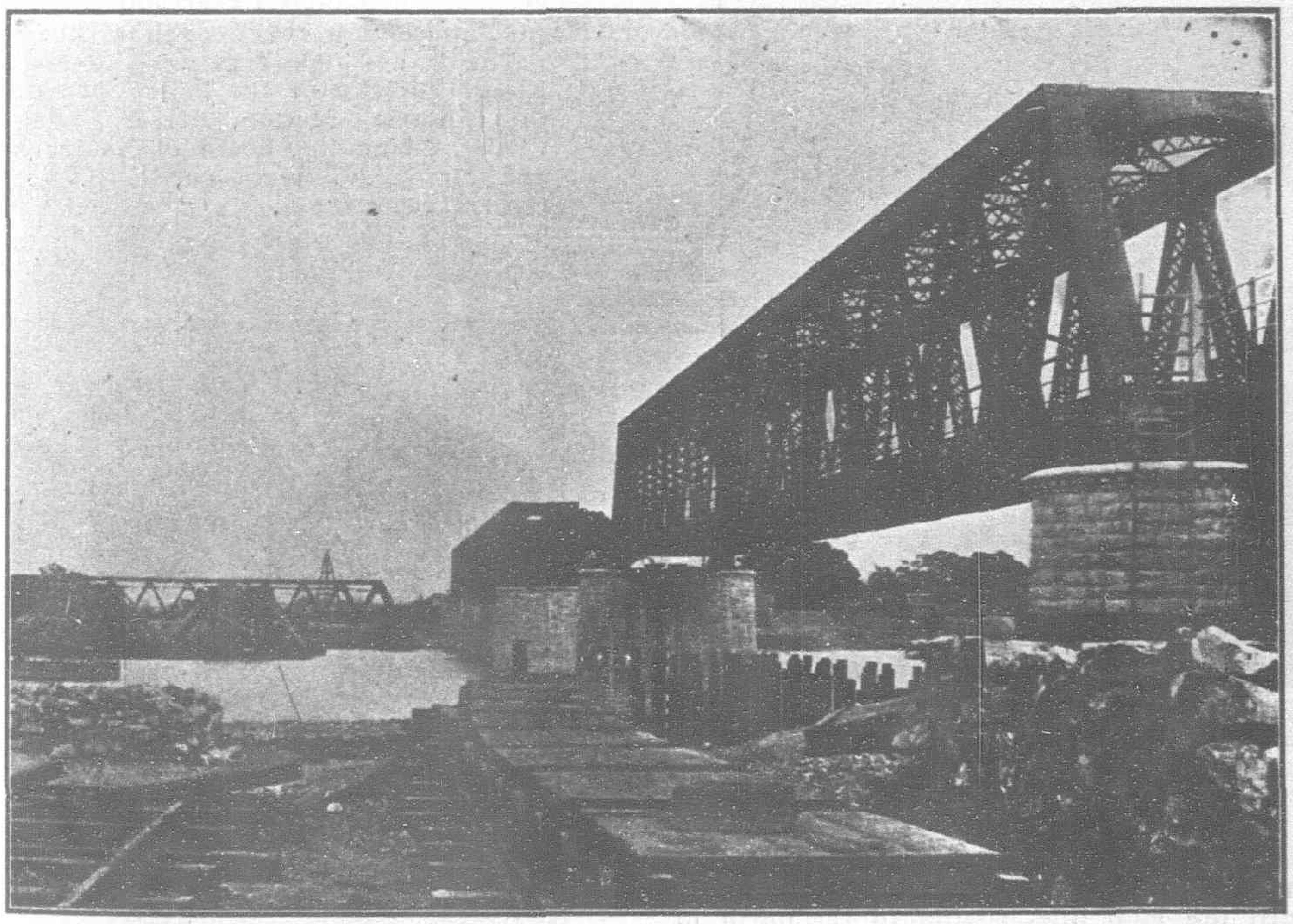
TYPICAL STATION ON BRITISH SECTION KOWLOON-CANTON RAILWAY.



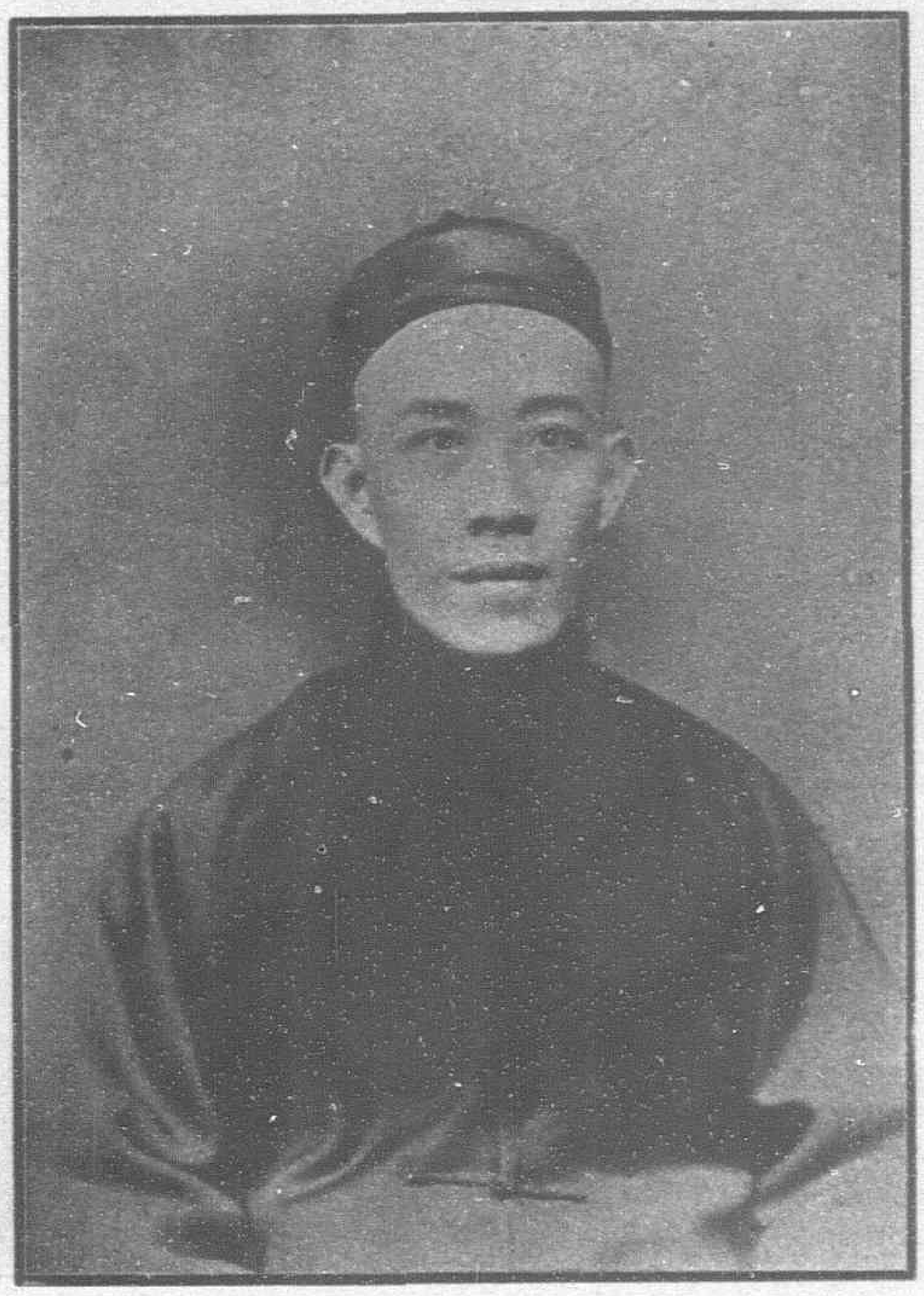
BRIDGE CONSTRUCTION ON THIS LINE.

FRANK GROVE, M. I. C. E., ENGINEER-IN-CHIEF

TAOTAI CHAO CHING-HUA, MANAGING DIRECTOR

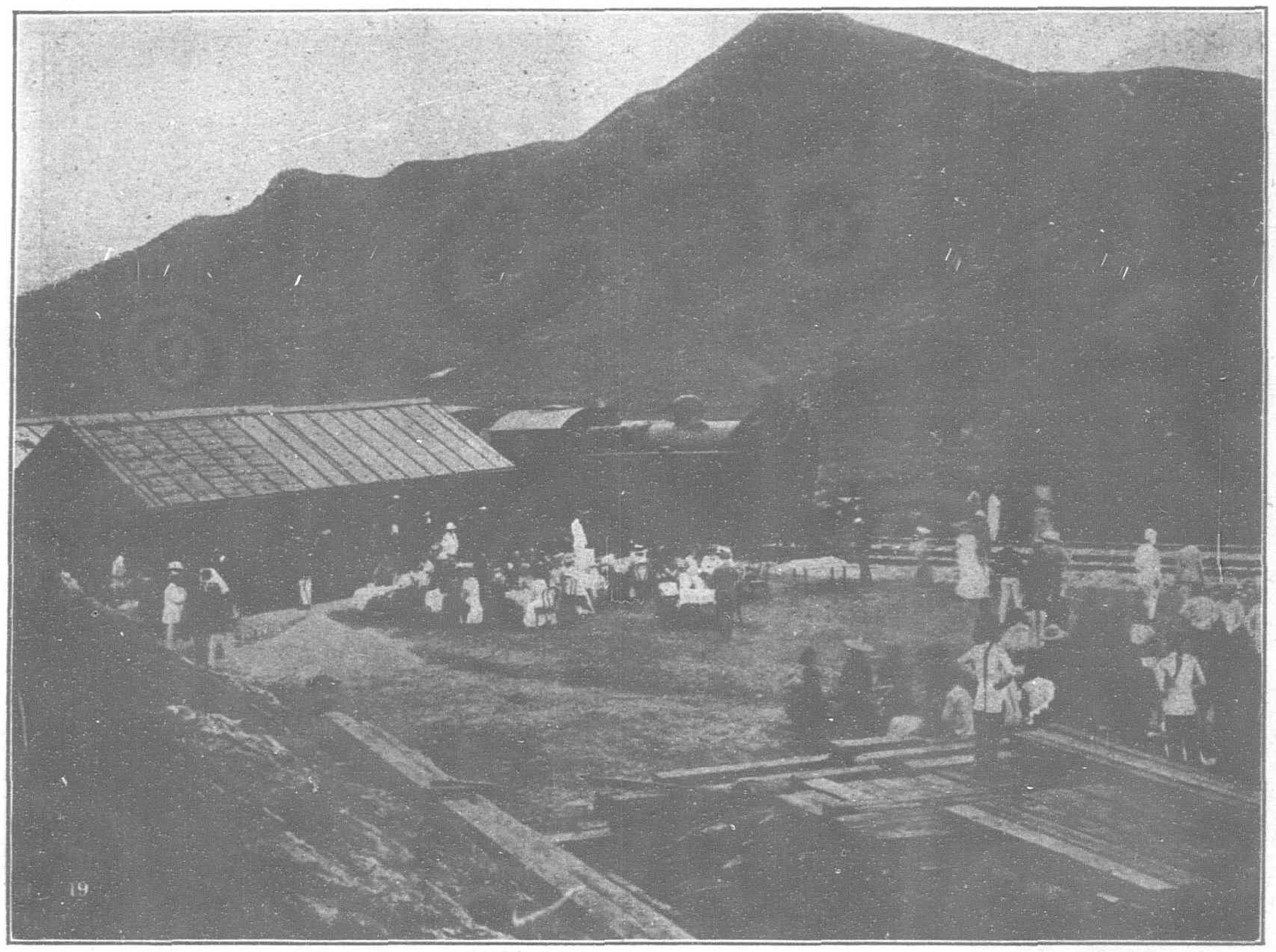


THE TUNG KUN RIVER BRIDGE, CANTON-KOWLOON RAILWAY.



C. T. LIU, TRAFFIC MANAGER.

"Until recently the idea was generally held that the Chinese section went through level paddy fields and had a few bridges. This is not quite a correct description. The hilly portions of country passed through present interesting features and some of the cuttings have given considerable trouble. Our ruling grade is 1 in 150, of which we have over 17 miles; 56 per cent. of our total length is on grade and 44 per cent. on level. Curvature of the line is 24 per cent. of the total length. The earthwork is on the whole what is termed 'heavy.' It has cost $20,700 per mile, which includes all charges for rock, earth, and protection works. The volume is equal to a bank of our type section 11 feet high throughout for 89 miles. Sufficient has been already stated and published with regard to the large bridges. We have 46 girder bridges with a clear opening of 4,868 feet and 39 arched bridges over 5 feet span with an opening of 546 feet. There are an nnusual number of culverts under 5 feet, namely 140, with an opening of 544 feet. The total opening therefore, provided by these bridges, arched bridges and culverts is 5.958 feet, or 67 feet per mile. In addition there are 265 barrel or pipe drains with an opening of seven square feet per mile. As an instance of the comparative amount of large bridge work on the Chinese section, I may say that the total weight of steel work in girders and foundations is 4,725 tons, or 53 tons per mile, while that used on the Shanghai-Nanking Railway amounted to 9¾ tons per mile only. There



IOWU STATION AT THE BOUNDARY LINE BETWEEN BRITISH AND CHINESE TERRITORY AND TERMINAL OF BRITISH SECTION.

VIEW FROM NORTH PORTAL OF TUNNEL NO. 5 ON BRITISH SECTION DURING CONSTRUTION.

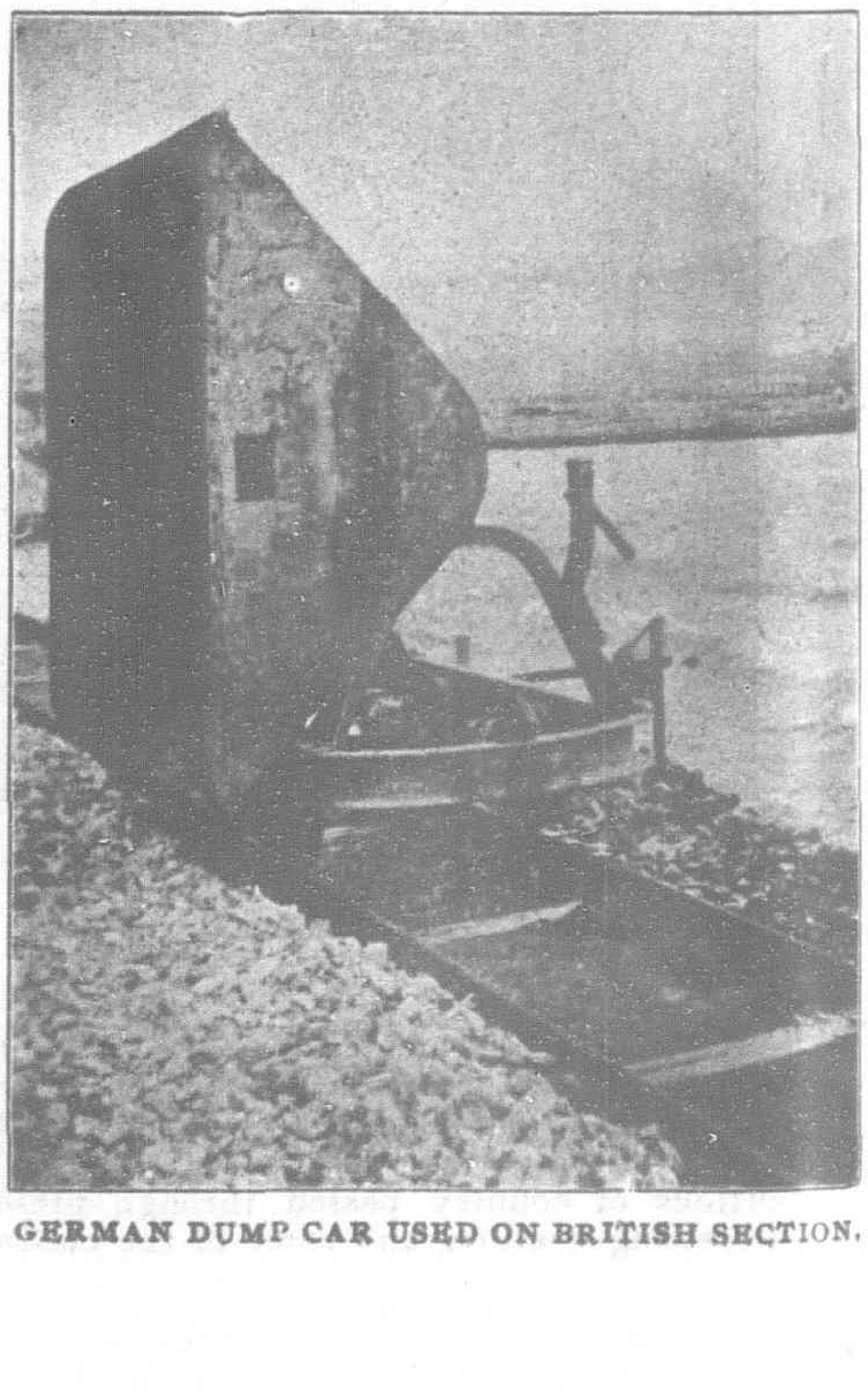
are 27 stations, 13 of which are halts or semi-permanent stations until traffic justifies their reconstruction on more permanent lines. We have four watering stations and three running sheds under construction and shortly to be finished, with workshops and such other equipment as is essential for present needs. The track and ballasting, I think, will be admitted to be up to a first class standard. There are 89·04 miles of main line and 11.46 miles of sidings and loops, making 100½ miles altogether of single track. A depot has been provided at Tungshan for the eventual junction with the Yueh Han Railway, and sufficient land with sidings and sheds are ready, but the junction station will not be undertaken until the loop line passing to the north of the city is under construction. Finishing touches are here and there required, but I have every confidence that our Chinese section will prove itself equal to what is expected of it, at first to deal satisfactorily with the important traffic between Hongkong and Canton, and later on as a link in the great Southern Trunk Line. (Loud Applause.)

The Hon. C. H. Ross, representing the British and Chinese Corporation, proposed the toast "Success to Railway Enterprise in China." He reviewed the history of railways in China and of the future of proposed lines. He said:

"What about half a century ago was merely a 'great need' has to-day become an 'imperative necessity,' which I am glad to say is now clearly recognised by all the leading statesmen of the Empire, and it is pleasing to note that no less than three great trunk lines (Tientsin-Pukow, Canton-Hankow, and Hankow-Szechuen) are now in active progress. For the present, however, China cannot construct her railways without the assistance of foreign capital, and this can only be obtained subject to an Imperial guarantee. I think, therefore, that the recent decision of the Imperial Government, that all the important trunk lines shall be State-owned, is a wise and far-seeing policy, and though it may now cost considerable sums to fully satisfy the claims of the various local and provincial companies, yet in the end the money will be well spent, as China will be saved from evils which would result from lack of central control, and from the friction which would inevitably arise when local considerations clashed with Imperial requirements. (Hear, hear.) For years to come also, China must look mainly to foreign engineers to superintend the construction of her railways, and, in this connection, I would, with all respect, venture to remind her that the better the class of engineers employed, so much the better will the experience be of the numerous young Chinese engineers now being trained, and to whom in the not distant future she must look to control and carry on these great enterprises.

"Finally—and perhaps to China the hardest task of all—she must realize that efficient maintenance of her railways is the only sound policy, and that to allow a well constructed line to go to rot and ruin for lack of efficient maintenance or supervision is a suicidal policy, which must react to the great detriment of the Empire.—(Applause.) All the world knows that China has conceived and carried out great enterprises,—some of them perhaps on a greater scale than any hitherto attempted by other nations,—but, alas, which of her many great works has been efficiently maintained? As an instance, witness the Grand Canal and that magnificent conception, the Tungchow Road."

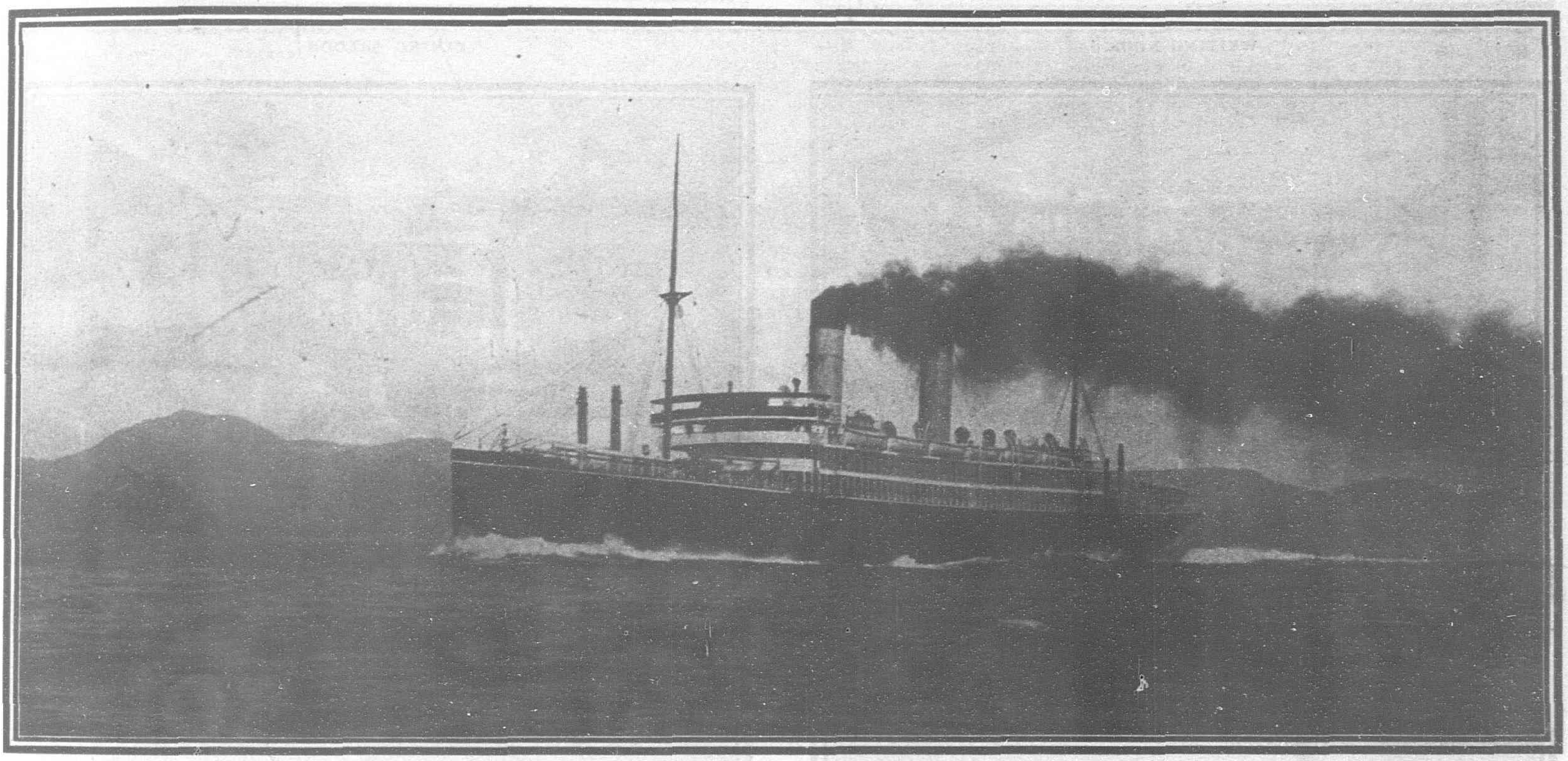
The other speakers were Taotai Cheng Yung, Director of the Police Department of the Chinese Section, H. E. Lung Chien Chang, Councillor, Board of Communications, and Mr. J. W. Jamieson, H. B. M. Consul General at Canton.



GERMAN DUMP CAR USED ON BRITISH SECTION.

THE SHINYO-MARU, THE TOYO KISEN KAISHA'S NEW PACIFIC GREYHOUND

When the Toyo Kisen Kaisha gave the order for three 13,500-ton passenger steamships, capable of steaming 19 knots and driven by turbine engines, to the Mitsu Bishi Dockyard & Engine Works, Nagasaki, considerable astonishment was expressed in shipping circles and the result was awaited with much interest, says the Nagasaki Press. Two of the vessels, the Tenyo-Maru and the Chiyo-Maru, have been in service some time and are regarded as among the most comfortable liners on which to cross the Pacific. Yesterday the third, the Shinyo-Maru, left Nagasaki on her maiden voyage but without passengers, the scheduled trip commencing at Kobe. The turbines of the Tenyo-Maru and Chiyo-Maru were made in England but those of the third vessel are the product of the Mitsu Bishi Company, which possesses the patent rights in Japan for Parsons' turbines, and to that extent the Shinyo-Marn is more completely Japanese than her elder sisters. The success attained by the Mitsu Bishi Dockyard & Engine Works in the construction of these three vessels is, we believe, regarded abroad as the most convincing proof of Japanese industrial development and for many years to come as they speed across the Pacific these ships should prove splendid advertisements for their builders.



THE NEW TOYO KISEN KAISHA'S PACIFIC GREYHOUND,—THE "SHINYO-MARU," BUILT AND ENGINED BY THE MITSU BISHI DOCKYARD & ENGINE WORKS AT NAGASAKI.

The new boat is double-bottomed throughout, with ten water-tight bulk-heads, and numerous water-tight doors automatically arranged so that all or any one of them may be instantly closed from the bridge. Her wireless apparatus is the finest and most up to date of any on the Pacific, having a working range of over three thousand miles. The automatic sounding apparatus with which she is equipped is the last word in navigation safety appliances. This little instrument works to perfection in thick fogs, as it enables the navigator to find his position by picking up land noises and bells that cannot be heard with the ear. It works automatically and always correctly. It is well to mention that this will be the first sounding instrument of its kind to be introduced on Trans-Pacific ships.

The dimensions of the vessel a·e as below:—

	Feet.	In.
Length	575.	
Breadth	63.	
Depth up to D deck	38.	6.
Depth up to C deck	46.	6.
Height between B & C decks	9.	

CAPACITY IN TONS:—

Cross	13,377.38
Displacement	21,600.
Cargo capacity	9,262.

ACCOMMODATION:—

1st class	210
2nd class	57
3rd class	754
	1,021

The speed attained on her trial trips is 21 knots.

RECEPTION ON BOARD THE "SHINYO MARU."

On Sunday morning, at five o'clock, the "Shinyo-Maru" left the harbour for consumption trials, to test compasses, etc., and returned shortly after three o'clock in the afternoon after a successful trip. From 3.30 to 6 a reception was held on board, a large number of residents foreign and Japanese having been invited by Mr. Hara, the superintendent of the Toyo Kisen Kaisha.

On arrival the guests were welcomed by officers and then allowed to wander about at their pleasure, inspecting the cabins, saloons, etc. The bulk of the cabin space is devoted to first-class requirements and no trouble has been spared to make the traveller comfortable. All the latest inventions and innovations have been applied and the furnishing has been done in excellent taste, both comfort and health being studied. The berths were made by a London company and are more roomy than those usually found on steamers. An electric reading lamp is attached to each berth in addition to the usual cabin lights. For wealthy travellers, or invalids, two suites of rooms are provided, each consisting of sitting-room, bedchamber, and bath. Electric fans cool and ventilate each cabin and there are heating arrangements for use in winter.

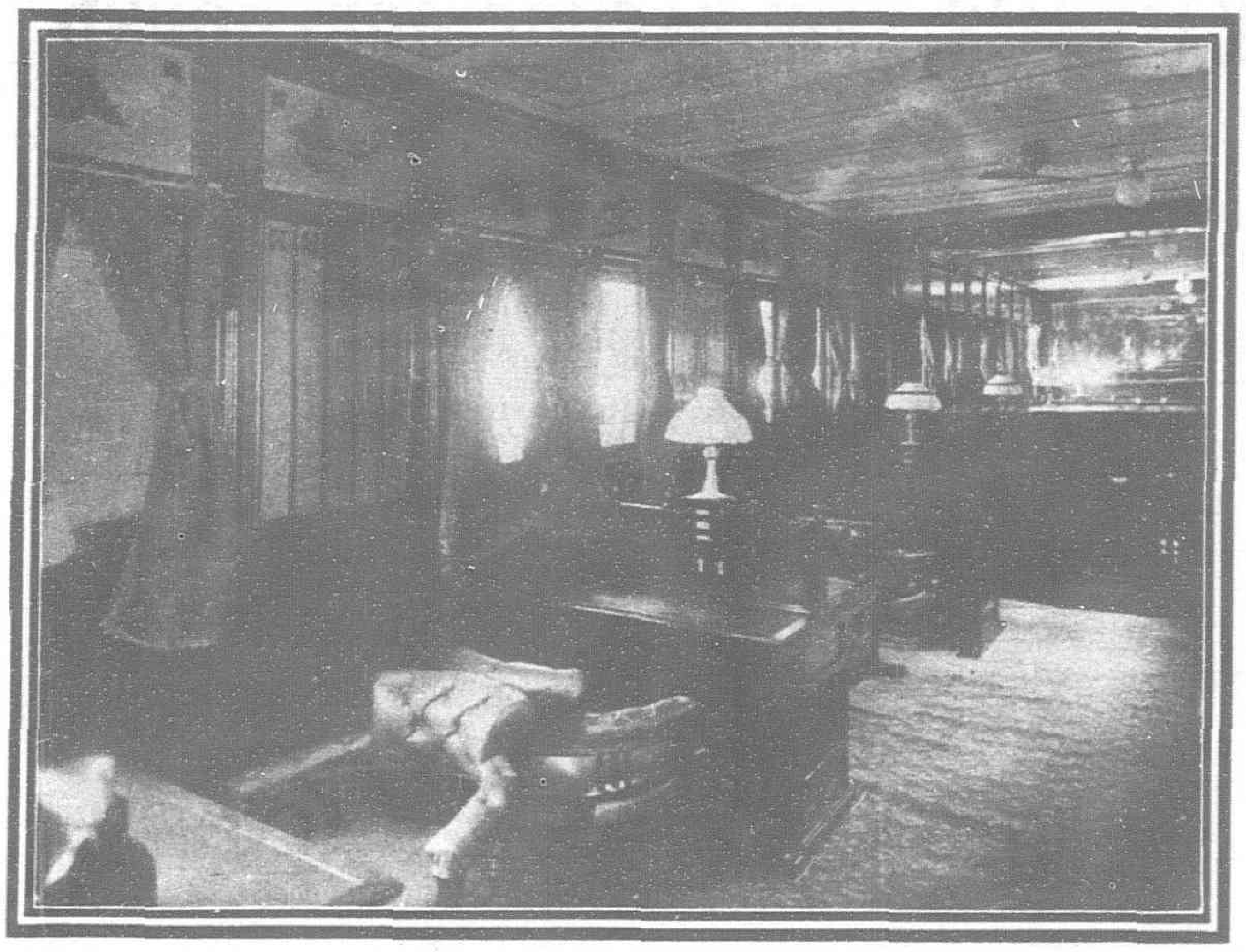
The first-class dining saloon, as is usual with the latest type of ocean liners, contains only small tables each seating six or eight persons. It is a commodious and well ventilated apartment with windows opening on to the C deck. The grand stairway entering into the saloon is decorated in magnificent style. A large brocade panel forms the principal decoration, the subject being Cherry Blossom, significant of the Spring and emblematic of the steamer's name "Shinyo" or "Spring Ocean".

Immediately above the dining saloon is the drawing-room which is decorated and upholstered in excellent taste. It abounds in easy chairs and cosy corners. A grand piano, made in Japan, by the way, and said to possess a splendid tone, suggests pleasant musical evenings and concerts. On the same deck are the writing-room, the lounge, and the smoking-room. In the latter we noticed a most comfortable-looking fireplace, à l'Anglaise; as we looked an attendant touched a button and immediately the dead cinders became red-hot, presenting a cheerful, wintry appearance; there may be such fireplace in the other saloons but we did not notice them.

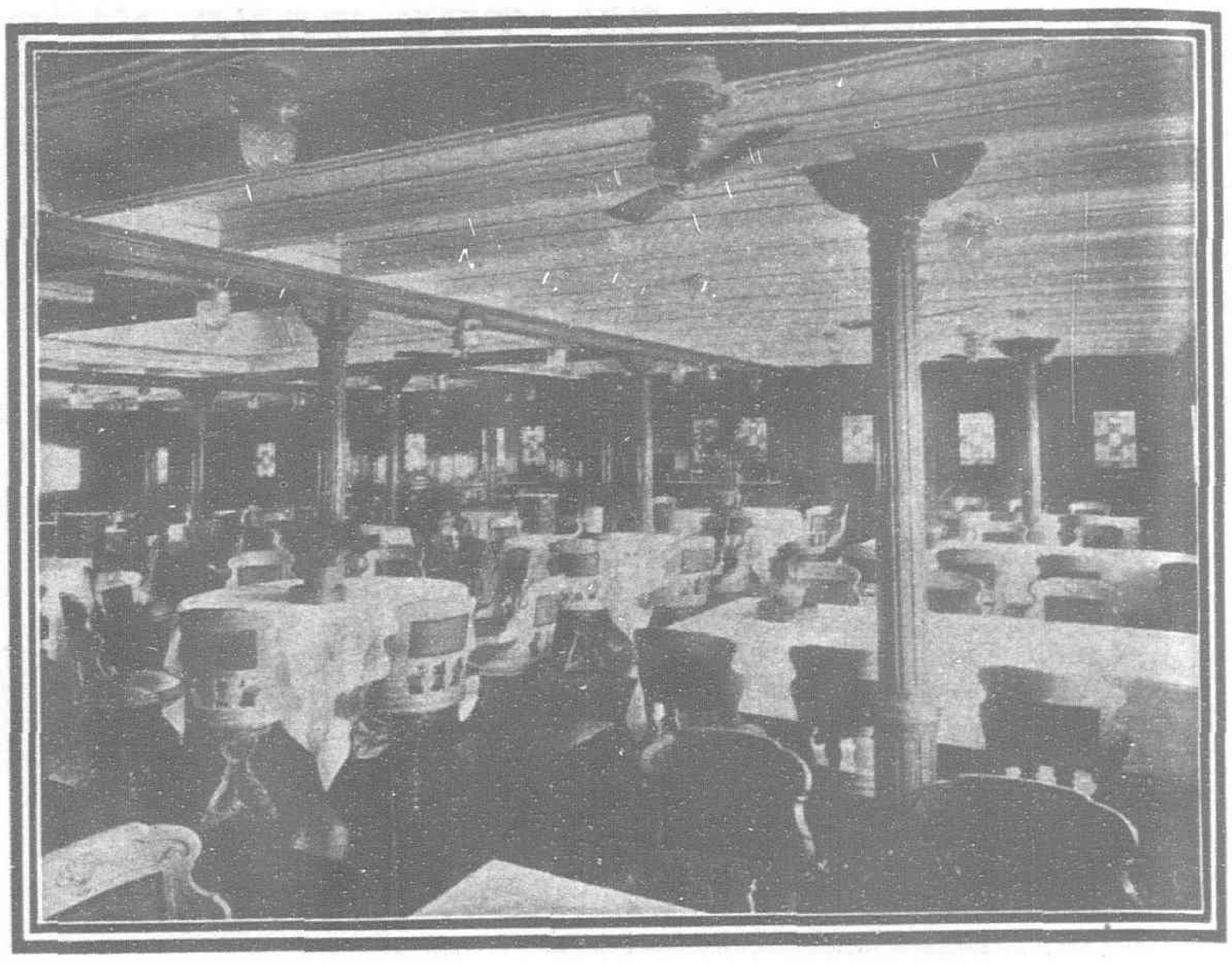
On what is known as A deck—the boat deck—there is a palm-house, with beautiful palms and ferns, forming a pleasant observation saloon. Arrangements have also been made for passengers to dance and swim if they wish to do so—a space being left on the B deck for dancing and a swimming tank of large dimensions being placed forward of the dining saloon.

The second-class accommodation is on D deck. The cabins are very fine and even

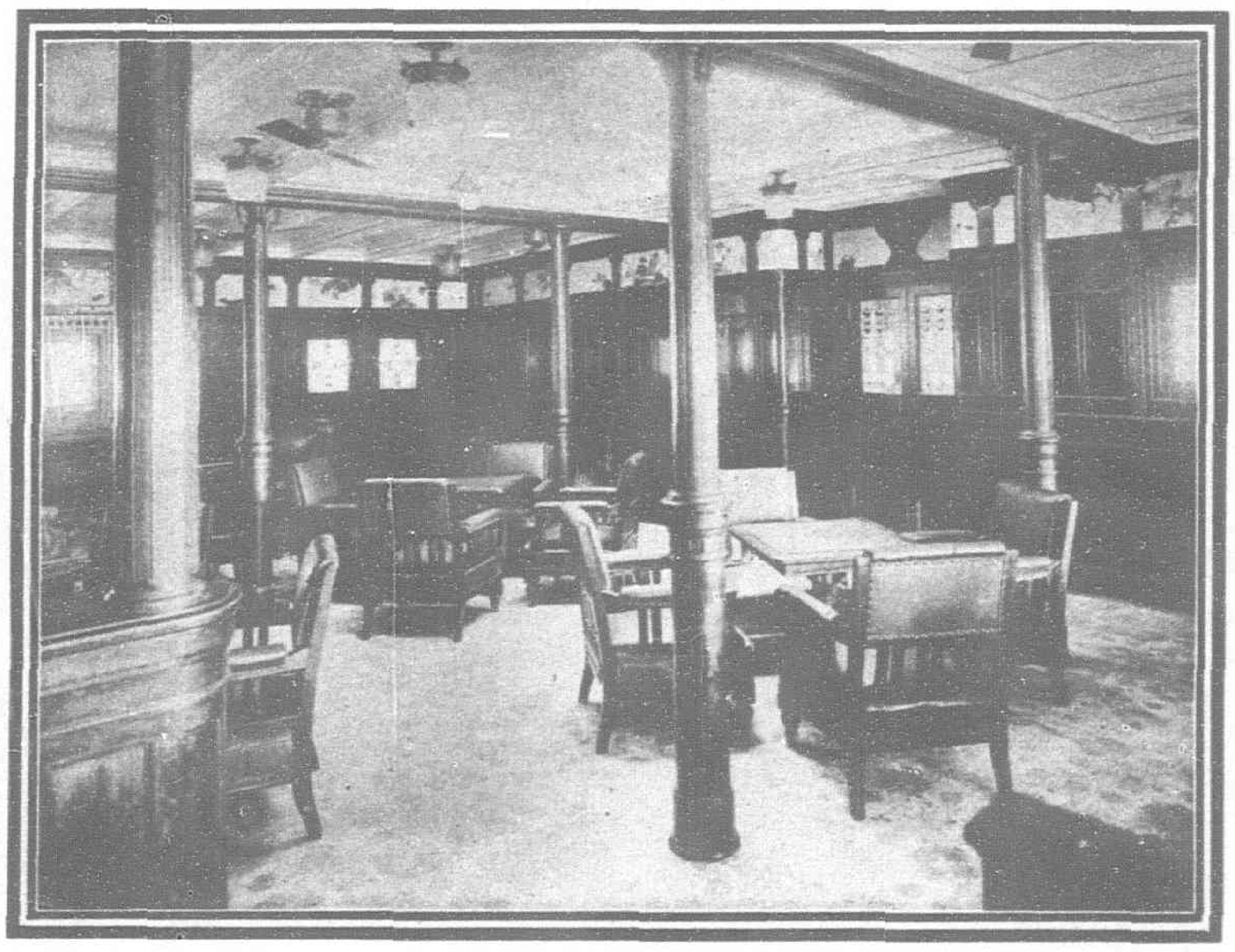
(Continued on page 159)



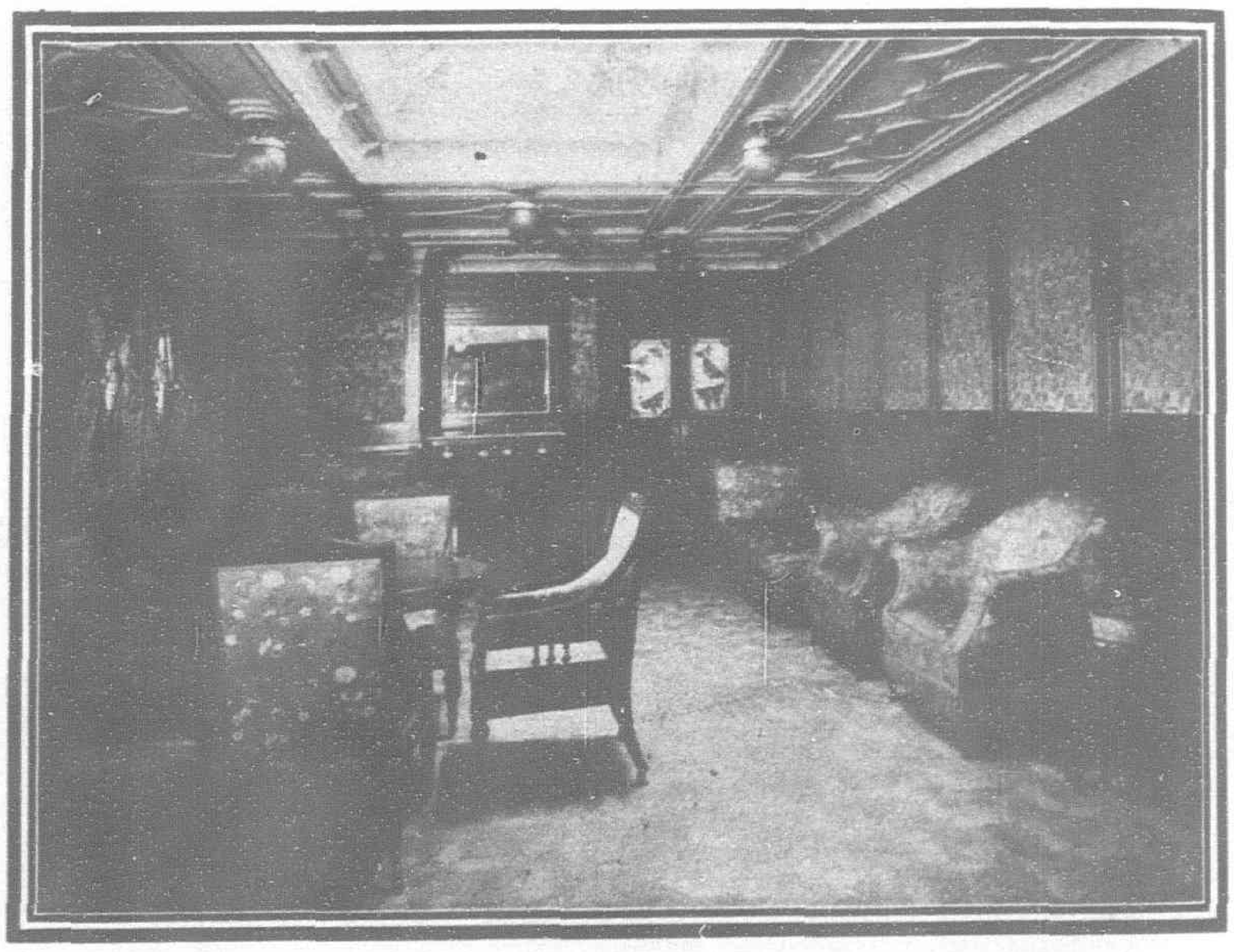
WRITING ROOM



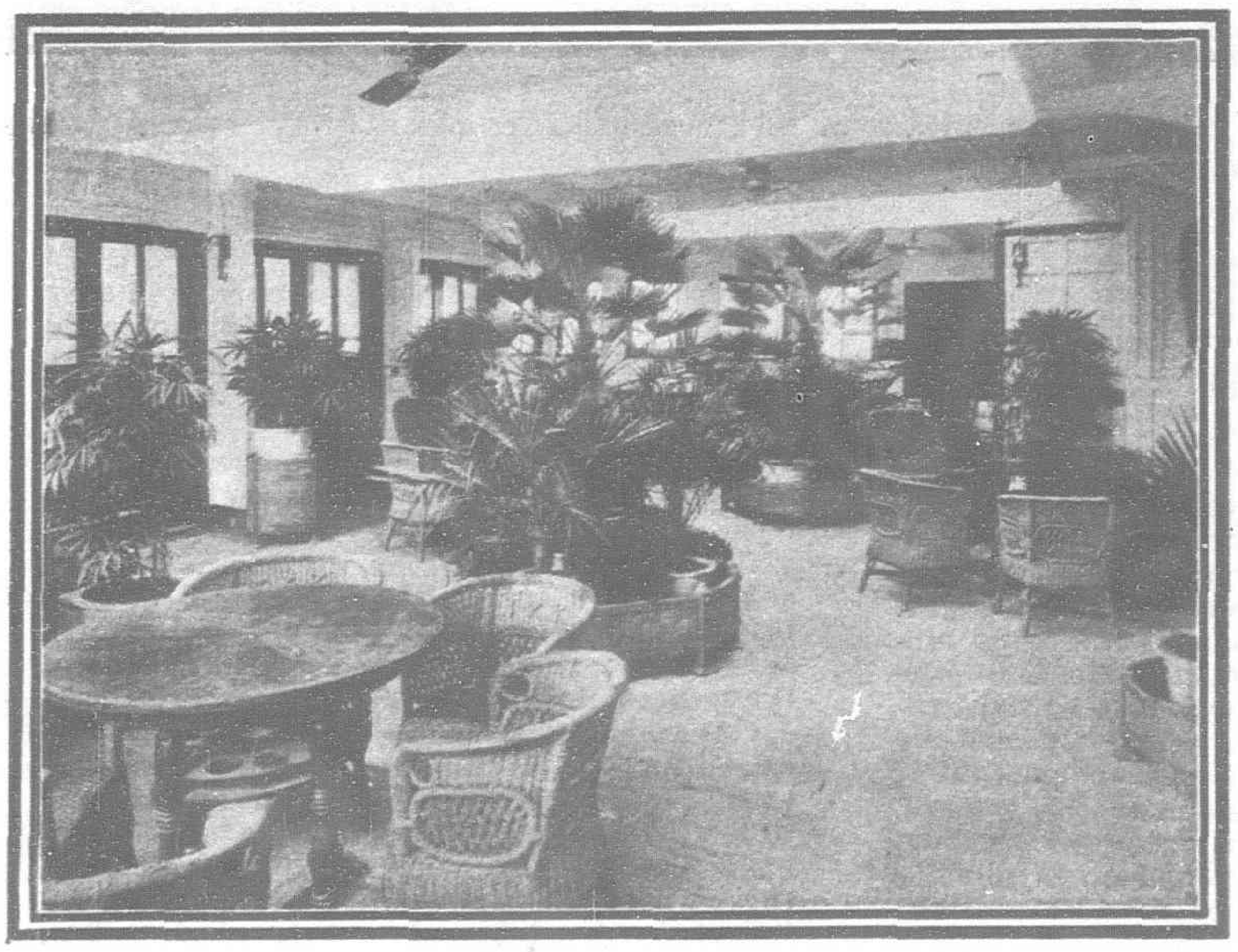
DINING SALOON



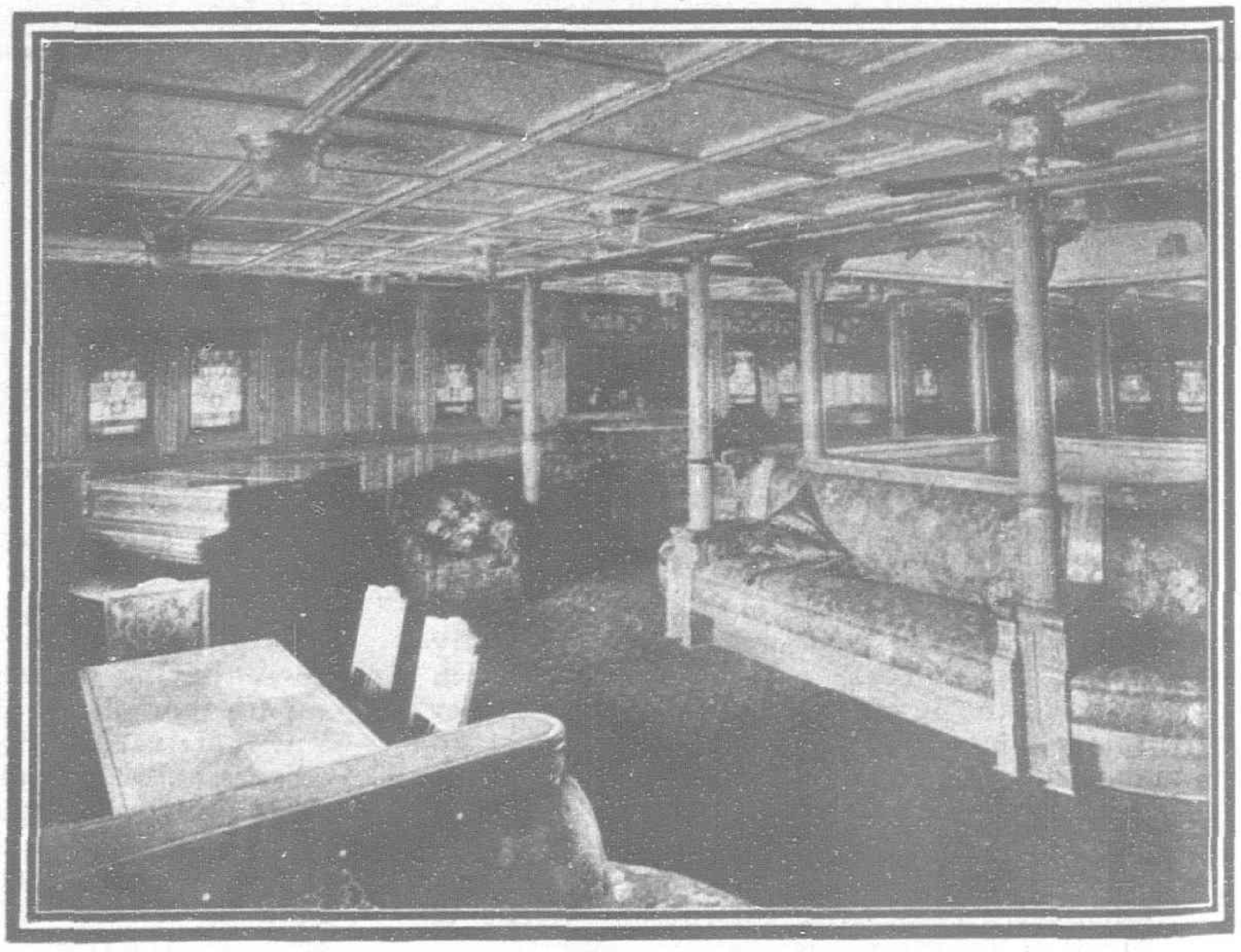
THE SMOKING ROOM



THE LOUNGE



THE PALM GARDEN



SOCIAL HALL

Interior Views of the S. S. Shinyo Maru

THE FAR EASTERN REVIEW

GEO. BRONSON REA, M. E.
PUBLISHER

WILLIAM CROZIER, Editor.

COMMERCE :-: ENGINEERING :-: FINANCE

A Monthly Review of Far Eastern Trade, Finance and Engineering, Dedicated to the Industrial Development and Advancement of Trade in the Philippines and Far Eastern Countries

PUBLICATION OFFICE:
MANILA, PHILIPPINE ISLANDS

CHINA OFFICE
Shanghai

GREAT BRITAIN:
SOLE ADVERTISING AGENTS
WALTER JUDD, LTD.
5 Queen Victoria Street, London, E. C.

SUBSCRIPTION AGENTS:

HONGKONG.............. KELLY & WALSH, LTD.
SINGAPORE.............. " " " "
YOKOHAMA.............. " " " "
SHANGHAI.............. " " " "
TIENTSIN.............. TIENTSIN PRESS, LTD.
WASHINGTON, D. C..... BRENTANO'S.

SUBSCRIPTION RATES: Philippines, United States, Canada, and Mexico, $2.50 U. S. C. per year. To all other countries in the Postal Union, $3.00 per year. Single copies 25 cents, U. S. C.

ADVERTISING RATES will be mailed on application.

Communications pertaining to the Editorial Department should be addressed to THE EDITOR.

ENTERED AT POST OFFICE, MANILA, P. I., AS SECOND CLASS MATTER.

MANILA, SHANGHAI, AND YOKOHAMA, OCTOBER, 1911

CONTENTS

PAGE
The Imperial Chosen Railways.................. 141
New Gould's Self Acting Triplex Plunger 148
Opening of the Chinese Section, Canton-Kowloon Railway........................ 149
The Shinyo Maru.................. 155
Japanese View on Opening of the Panama Canal 157
Ozone as a Purifying Agent.................. 158
The Filipino as a Skilled Laborer.................. 158
The Chapei Water and Electrical Works.......... 160
Commercial Value of the Saps of the Nipa and Other Palms.................. 162
Far Eastern Railways.................. 167
Philippine Mining News.................. 168
Contracting News.................. 168
Far Eastern Engineering, Construction, Commercial and Financial News.................. 169
Another Cordage Plant for Manila.............. 171
London Metal Market.................. 171

JAPANESE VIEW ON OPENING OF THE PANAMA CANAL

The effect of the opening of the Panama Canal on the trade routes of the world has been widely discussed by western publicists. They have dealt with its advantages from the Occidental viewpoint and especially with reference to the commanding position it will accord the United States when once in operation. As it will greatly affect the foreign trade of the Orient by creating more active interest in Europe and America in commercial expansion in Eastern Asia, in view of the more direct route available between large trade centers, Eastern opinion on the subject of advantages to be realized will be of interest at this time.

Japan with its growing shipping trade is perhaps more greatly interested in the opening of the canal than any other eastern country. We have before us an article by Baron Kenko Kimotsuki appearing in the *Japan Financial and Economic Monthly* which may be taken as an authoritative Japanese expression on this subject.

The Baron believes that as a direct result of the opening of the canal the increased purchases of coal and water by steamers docking, etc., together with tourist trade will reach 300,000,000 yen annually by the year 1935. Baron Kimotsuki writes:

"In diplomacy and politics, as well as in military affairs, there is witnessed great activity and therefore no room for indulgence. Since Japan has come to occupy a part of the active world, Japan could no longer remain in the state of inglorious ease. Passing through the Japan-China and the Japan-Russian wars, Japan has come to rank herself among the first class nations of the world, and therefore her responsibility is cosmopolitan. In order to retain this position, and to maintain the history of the unbroken Imperial line, there must be provided defensive power. Up to the 19th century, by the defensive power is understood as the military and naval strength. Subsequent to the Imperial despotism, the defence has grown to be national affair. It has come to include not only the military power but the financial strength as well.

"The military strength may be classified into two classes, namely, direct and indirect. The former signifies the combined force both of the navy and army, while the latter implies every thing but the military and naval strength, and hence it may be called the power of wealth. The military strength as well as the strength of the wealth are equally indispensable to the interests of the country. One can hardly do without the other. The state devoid of such provisions may not exist in perfect state. The present condition of Japan shows that it attained well-nigh military perfection, but in the respect of wealth, it has still sad defects. It is desirable that the wealth of the country should be increased so as to make the defensive power complete.

"How could we enrich this country? Scholars may cherish different opinions, but Japan being surrounded by seas on all sides, the best course that she must take is to utilize the sea There are comparatively few Japanese who make efforts to enrich the country by sea, because the people pay much attention to the land.

"It is to be seriously considered that there is such a defect for the Japanese who should utilize the advantages afforded by the sea. The opening up of the Panama canal is, therefore, looked up with the greatest interest by the people.

"Before judging the utilization of the Panama canal, of its effect upon our economic circle and advancement of our national wealth, it is necessary to note the position occupied by us in relation to other powers of the world.

"The total number of the standing army of the 1st class nations of the world is figured at about 5,000,000 of which Russia has the largest force, the number being about 1,100,000 which is about 20% of the total number of the standing army of the 1st class nations of the world. The standing army of Japan is about 250,000 so that our force is about one quarter of that of Russia. Excepting Austria, the naval tonnage of the 1st class naval countries of the world is about 5,200,000 tons of which England has 1,800,000 tons which is about 38% of the total naval strength owned by the 1st class nations of the world. Japan's naval strength is about 500,000 tons which is a little over one quarter of the force of England. Both the navy and the army of Japan combined forms one quater of the strongest power of the world. Let us form a comparison of the wealth. The volume of the trade done by the 1st class nations was 44,700,000,000 *yen* in 1905 of which 17,200,000,000 *yen* was done by England that is about 40% of the world's trade. In 1868, Japan's trade amounted to 26,000,000 *yen*, in 1907 900,400,000 *yen*, in 1908 840,000,000 *yen* and in 1909 950,000,000 yen.

"Thus it will be found that both in respect of wealth and naval strength, England occupies the most important place. Therefore England suffered very little economically although she spent over 2,300,000,000 *yen* in the war with the Boers. Had Japan not had the sympathetic pecuniary support from England and America, she would have found it almost impossible to have continued war. In order to make Japan's wealth correspond with her military strength, her trade should be swelled up from 4,000,000,000 *yen* to 4,500,000,000 *yen*. The wealth and military strength matches very poorly. The opening up of the Panama canal will produce some changes upon the main sea routes of the world, and Japan will enjoy a special privilege in making supply of coal and water as well as various conveniences connected with the mooring. The beautiful scenery of Japan will no doubt invite a large number of foreign visitors from all quarters of the world.

"The world's trade may be divided into that between Europe and Eastern Asia, that between Eastern Asia and North America and Europe. The freight exported from Europe to Asia is greater than that imported from Asia to Europe. The freight exported from Eastern Asia to North America is greater in volume than the freight imported to Eastern Asia from North America. Again, the freight exported from North America to Europe is greater in amount than that imported from Europe to North America. The world's trade in the West is superior to the East. Should the Panama canal be opened, the goods exported from Europe to Eastern Asia shall be sent to Eastern Asia while the goods exported from Eastern Asia to North America shall be conveyed to North America, and on the return trip vegetables and flour will be brought back to Europe.

"It may be argued that European ships will return direct to Europe from Eastern Asia rather than *via* Panama canal because of the shortness of the distance, so that the number of those who will take the circuitous course will be very small. As already explained, the export from West to East is very large, and hence ships coming from Europe to East Asia will have to call at North America so that a greater amount of freight could be conveyed by this route. The distance may be larger but a great advantage will be given to the ships' owner. Such is the reason why we stated that the opening up of the Panama canal affects the world's sea route. Because of such a change, the supply of coal and water to the ships coming from Eastern Asia to North America is to be made from Japan. The coal from China is not so easily available as that of Japan owing to the problem of communication facilities In respect of water, the same is true. Water in China is supplied at the rate of 1 *yen* per ton while that in Japan at the rate of only 25 *sen*. Let us figure out the exact amount of water and coal supplied. Ships entering Yokohama, Kobe, Nagasaki and Moji from 1901 to 1904 reached an average of 3,355 per year, and average tonnage was 3,830 tons. From 1905 to 1908, average number of ships entered the harbour per year was 3911 and average tonnage per vessel was 4,540 tons. When these figures are compared it will be seen that number of ships was increased by 16½% and the tonnage by 18½%. Should such a rate of increase be preserved, within the 20 years after the opening up of the Panama canal, that is, on January the 1st, 1935, the number of ships will be increased to 9,828 and the tonnage per steamer will reach 12,571 tons. Making every possible allowance for the variation in figures, the number of ships figured at 10,000, and tonnage per steamer reduced to 6,000 tons and average speed regarded as 10 nautical miles and speed of the vessel making 240 nautical miles day and night, it will take from Japan to North America 18 days to cover 1,320 miles. Thus at least the coal and water for 20 days will be needed. Supposing that the amount of coal needed per day and night ranges between 60 tons and 65 tons, the total amount of the coal required for the year will reach 12,000,000 tons. Figured at the rate of 8 *yen* per ton, the result will be 96,000,000 *yen* while figured at the rate of 10 *yen*, we will obtain such a large figure as 120,000,000 yen. The water needed for the steamer of 6,000 tons to cross the Pacific is in average 700 tons so that the total amount will reach 70,000,000 tons, sold at 50 sen per ton, the amount will reach 35,000,000 yen, and when both of these figures are combined, the total will reach 155,000,000 yen. Some of these ships may enter into docks, and seamen and passengers will spend their time and money on the land so that incidentally Japan will make the sum of 300,000,000 yen per year as the result of the opening of the Panama canal, and thus Japan's wealth will be greatly increased."

OZONE AS A PURIFYING AGENT

It is known that ozone is an uncolored gas having a peculiar odor. It may be considered as a condensed oxygen and is one of the most powerful of sterilizing agents. It is produced in the atmosphere by lightning discharges, a process of oxidation and water evaporation and is not found to any extent in the air of the streets of our cities and consequently a negligible quantity in the ordinary dwelling rooms of our great centers of population. But on the contrary it is found in the forests, sea-shores and mountains, especially during the spring and in agitated damp air, during gales and snowstorms.

The ozone oxidizes metals, whitens colored objects, destroys all kinds of organic matter found in dust, and other impurities of the air, as well as the microorganisms contained in water.

On account of the decomposition which accompanies this oxidation, the ozone gives out one third of its oxygen rendering most valuable help to modern sanitation and ozonating plants have been installed successfully in Europe and America.

Whenever there exists a surplus of ozone, the absolute absence of oxidizable matter, or impurity in the air, is guaranteed. It is a fact that oxygen is the only product of reaction, and is the gas of greatest importance in giving the ozone undeniable superiority as a sterilizer. It was not until very recently that the construction of proper ozonators made it possible to use ozone effectively in sanitation. The devices constructed by Siemen and Halske transforms the atmospheric oxygen into ozone by means of electrical discharges at high tension.

The city of St. Petersburg has just made an important application of this agent for the purification of water of one city, by installing a complete plant for ozonating water, writes Dr. Alfred Gradenwitz in *Cosmos*. The water in St. Petersburg was supplied by three great plants, of which only one (the greater one) had sand filters, while the other two were supplying water, such as it was, direct from the Neva.

The new plant for the supply of ozonated water was built on the premises of one of the two latter plants (that of Penkovaya) and it is capable of supplying 50,000 cubic meter per day.

Before applying the ozone, the water is subjected to a preliminary purification by passing through rapid filters into reservoirs where by means of sulphate of alumina the matter contained in the water is precipitated. After this process of clarification the water is subjected to ozonation.

There are eight reservoirs for clarification connected with each other by means of conduits and equipped with 38 rapid filters. These are made according to Howamtson system which is almost similar to the American method of Jewell. The principal difference between the two is that Howamtson uses flint especially prepared for filling the filters in place of ordinary fine sand. The output is approximately 4½ cubic meters per sq. m. per hour.

The filters are cleaned by washing them with filtered water and at the same time the flints are altered by means of special removers. The filtered water goes directly to the sterilizing towers, except a small volume diverted for cleaning the filters.

The ozonating plant proper is composed of two parts: the ozonator battery, and the sterilizing towers. The ozonator battery comprises 126 elements and there are five sterilizing towers, one of the latter being held in reserve. The tubular elements of the ozonator batteries are based as stated above upon the action of high tension discharges between two cylindrical ends of aluminum and glass respectively. It is operated with a relative elevated concentration of ozone (2.5 per cubic meter of air).

Before going through the ozonators the air is dried by refrigerating process in order to give the best results. Then it is blown through the ozonators by means of special conduits that absorb the ozonated air at an area of pressure of four meters of water, in order to mix it and pump it into the sterilizing towers. The absorption of ozone and the sterilizing of filtered water takes place partially in the conduits and partially in the sterilizing towers through which the ozonated air passes from the base to the upper part very finely pulverized, which prepares it for effective diffusion throughout the body of the water. After being aerated the ozonated water is deposited in special large reservoirs from which it is pumped at a high pressure for city distribution.

The plant is operated by an electrical plant equipped with boilers, steam engines, alternators, as well as three sets of high frequency converters through which the three phase current from the main generators are transformed into alternating current of 500 cycles per minute. The ozonators require for their operation a high frequency and high tension current of about 7,000 volts. The horse power capacity of the plant consists of two sets of steam engines of 150 H. P. each, connected directly with the three phase generators. A third set is kept in reserve.

From an architectural standpoint the plant is of special interest. All the large reservoirs for clarification, filters, as well as the columns and roofs of the buildings are built of concrete. The expenses of operation including the clarification and filtering is from 2.0 to 2.5 cents of Franc per cubic meter of which one-half is for the ozonating. This filtering and ozonating plant has fulfilled the hopes entertained as to the effectiveness of its purifying action from a physical and bacteriological standpoint. The dirty water from the Neva is transformed into a perfectly potable, pure, and transparent water, and is irreproachable from a sanitary standpoint, as it contains absolutely no typhoid fever, cholera, or other germs.

Two other installations of the same kind will be completed within this year for ozonizing the water supply of the City of Paris with a capacity of 46,000 cubic meters each.

The *Electrical World* directs attention to the effective electrolytic sewage disposal plant at Santa Mónica, Cal., and to a later installation in Oklahoma City, the latter being in operation since March 29 and which is an adaptation of the former, the first plant of its kind in the United States. Oklahoma City has also arranged for preliminary installations designed to manufacture precipitate capable of treating 40% of the water supply. The sewage purifying plant has a capacity to care for 20% of the present sewage. The agreement is with A. J. McMahon under patents issued Messrs. C. P. Chandler and L. C. Lautzenhiser of Santa Monica and under its terms the plant was installed without cost pending satisfactory operation and acceptance, and with the understanding that if accepted the process would be applied to the entire water and sewage disposal system of Oklahoma City.

The capacity of the water supply system of Oklahoma City is 10,000,000 gals. daily and the sewage flow which discharges at present into several different basins is approximately 3,750,000 gals. daily. The plant installed which treats one fifth of this flow includes installations on three flumes each of which includes electrodes of 10 inch by 24 inch by ⅜ inch iron plates, grouped in batteries of 27 adjacent plates being of opposite polarity. Ten of these batteries are installed in each flume and treats 250,000 gals. daily. Heavy copper busbars convey the current to the copper channel caps on each plate, the caps on the plates increasing their conductivity and aiding electrolytically in the purification process. The phenomena when the current is turned on the electrolyte over the plates is indicated by the appearance of fine milky bubbles of hydrogen and oxygen. The latter in its nascent form, attacks and destroys objectionable organic compounds present in the water and oxidizes other materials, while the ferric oxides also formed are said to exert chemical effects adding to the purification action. It is found that electrolytic action in one direction from twelve to twenty-four hours results in the collection of sludge about the cathodes. To clean the former cathodes and reduce unequal destruction of the anodes, the direction of the current flow is reversed.

The cost of operation of this plant using 900 amp. at 2.5 volts or 2.25 kw. to treat 750,000 gals. daily in three flumes at 4 cents per kw-hour would be $2.16 a day or $700 a year and if the total sewage was treated $3,500 a year.

THE FILIPINO AS A SKILLED OPERATOR

The recent extension of the plant of the United States Shoe Company of Manila representing a capital investment of ₱500,000 directed attention to another successful American enterprise in the Philippines that utilizes skilled Filipino labor exclusively throughout. Perhaps in no department of activity in the archipelago has there been developed from a very modest beginning such a large and thriving industry, not only returning fair revenue to capital but giving an object lesson of educational value in the development of an adequate force of trained and reliable operators from the raw material at hand.

The plant is equipped with the most modern machinery and is capable of turning out 300 pairs of shoes daily or 90,000 pairs annually. There are 125 operators of which 115 operate machines. The highest wage paid is ₱22 a week, while the lowest is from ₱6 to ₱8 per week.

Mr. R. A. McGrath, the president of the company, who was the founder of this modern industry in the Philippines and is familiar with its development, made the statement to the FAR EASTERN REVIEW that Filipino labor properly trained and supervised gives an efficiency almost equal to that secured by American plants with American operators.

"You may say," said he, "that the efficiency of the Filipino as a skilled laborer is measured by the care taken in his training and the standard of intelligent superintendence provided. My experience has been that the cost of superintendence in the company's plant here is from 30% to 50% higher than in similar shops in America where American labor is employed.

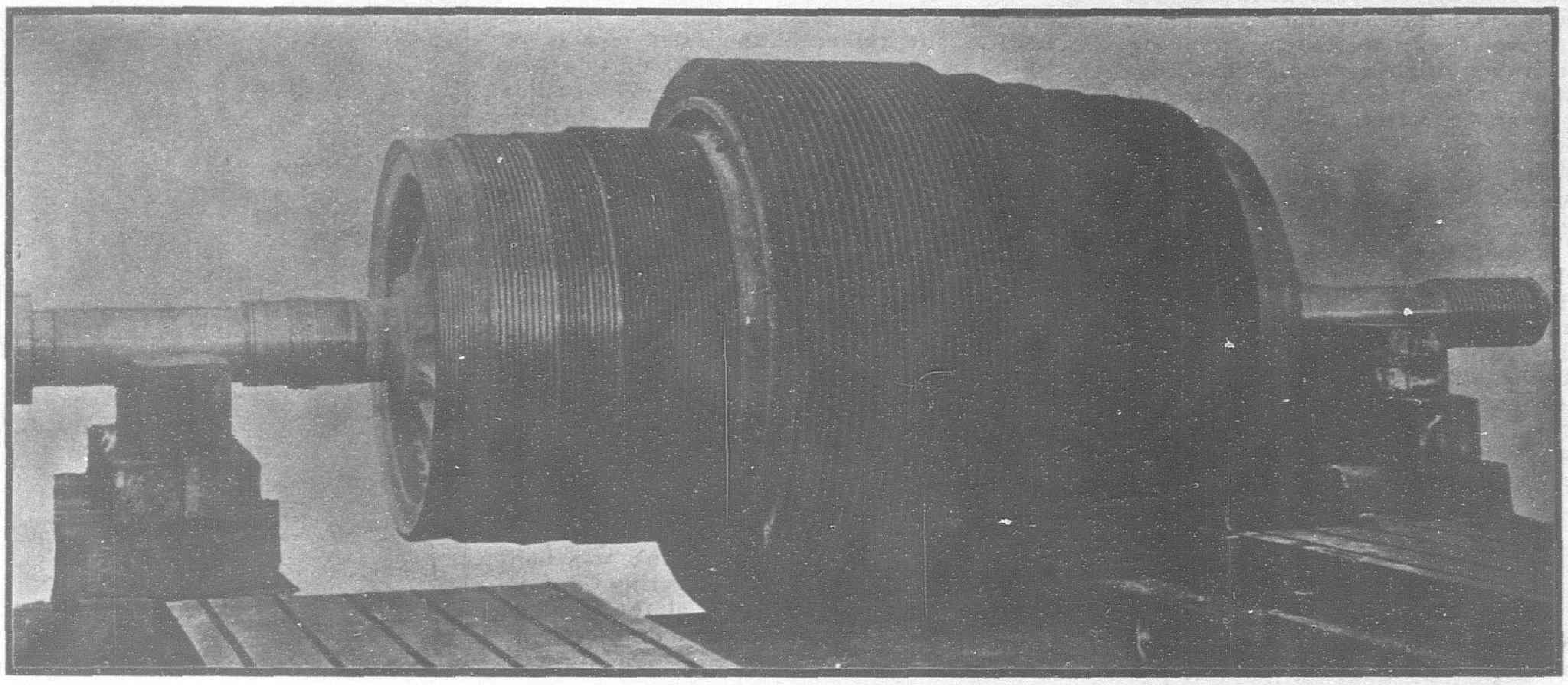
(Continued on page 159)

THE SHINYO-MARU, THE T. K. K. S. NEW PACIFIC GREYHOUND

(Continued from page 155.)

better than are found on many first-class steamers. The smoking-room and dining saloon are elegantly furnished for the comfort and pleasure of passengers who desire to travel at the cheaper rate. On E and D decks are the accommodation for steerage-passengers. These quarters are exceptionally neat, clean and well ventilated.

Freight, as well as passengers, is desired for the Shinyo-Maru and the vessel has been well-equipped for loading and discharging a cargo. She has 12 hatches, six derricks with 12 booms, also twelve 4-ton winches. The two foremost posts and booms are built for heavy cargo, having a lifting capacity of 25 tons each.

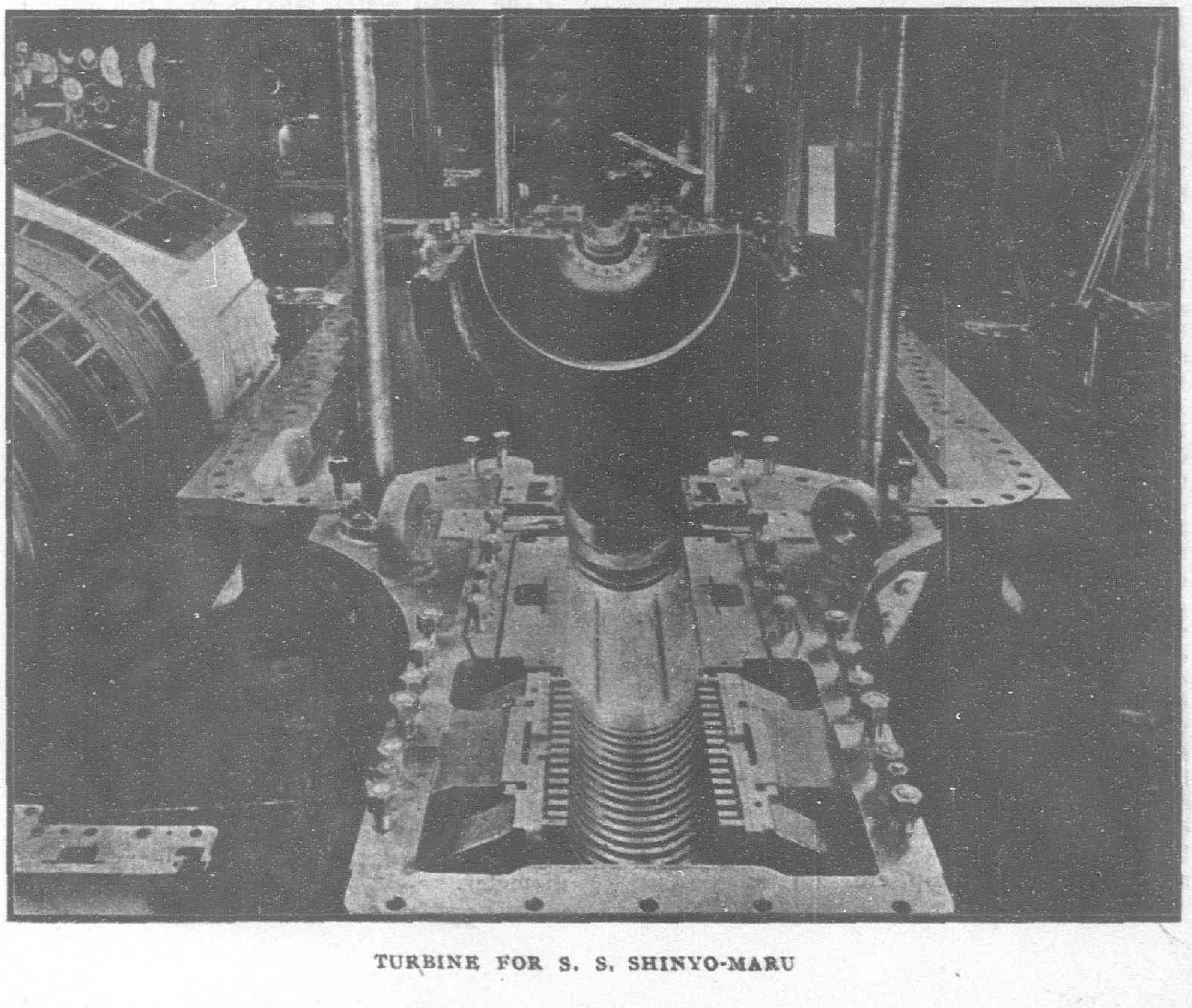


TURBINE FOR S. S. SHINYO-MARU

The inspection of an up-to-date liner is no easy task, so the host provided refreshments at each end of the vessel for the guests. Tea was served in the dining saloon and an opportunity given thereby to appreciate the table ware and the comfortable seats, also to wish continued success to the Toyo Kisen Kaisha and a useful career to the "Shinyo-Maru".

The turbine propelling machinery is of the Parsons type, having the three-shaft arrangement now usually adopted for mercantile work, with one high-pressure turbine coupled to the centre line of shafting and one low-pressure ahead and an astern turbine incorporated in the same casing, coupled to each wing-shaft. Each line of shafting drives one solid bronze propeller.

The turbines, manufactured at the Mitsu Bishi Works, accord with the most recent practice. The rotor-wheels are of cast steel, the spindles of a special forged steel, and the casing of cast iron. The blades, which number about half a million, are of hard-drawn brass, and are fixed in rotors and casings, in accordance with Parsons' usual design, having separate caulking pieces between the blades. The tips have been thinned down to a very fine edge in order to eliminate the risk of stripping, should they by any means touch the adjacent casing or rotor drums. This has enabled the clearances between the blades and the casings and rotor drums to be materially reduced, and consequently a source of loss in steam consumption has been minimised. The adjusting gear for the thrust blocks at the forward end of the turbines has been designed to admit of adjustments being made while the turbines are running. As is well known, the steam economy of the turbine is largely dependent upon the reduction of the working clearance of the dummy rings to a minimum. To this end the adjusting gear as fitted, in conjunction with a micrometer gauge, measures directly on the edge of the direct ring. It is found in practice that this clearance varies to a certain extent with the steam temperature, and final adjustment has therefore to be made after the rotor and casings are thoroughly heated, and after the turbines have been running for some hours. The difference of the thrust due to the steam pressure on the blades when in excess of the propeller thrust is transmitted by collars, turned on the forward end of the rotor spindle acting upon the top half of the thrust-block; when it is the propeller thrust that is in excess, it is transmitted by the same collars to the bottom half of the block. At full powers the steam thrust is in excess of the propeller thrust; but at low powers it is found that the propeller



TURBINE FOR S. S. SHINYO-MARU

THE FILIPINO AS A SKILLED OPERATOR

(Continued from page 158.)

There is also the question of selection to be studied in securing the best results. As you know the company has been expanding from time to time and the development of raw material into skilled labor has been continuously in progress. In the initial work of organizing when we employed but twenty or thirty operators great pains were necesary to explain fully every detail. Foremen, familiar with the language and native characteristics, were directly in charge of these raw apprentices and the degree of efficiency developed was measured by the capacity of the foremen to instruct in an intelligent manner and to supervise closely every detail undertaken by each apprentice.

"At first these operators could not be relied upon to work continuously but they soon realized that promotion with better pay was the reward for those who reported for work every day and by application endeavored to equip themselves for higher grade work. It was not long until there was a waiting list of apprentices and the irregular worker soon found his place taken when he returned from his usual weekly vacation. The result is that the present force is comprised of operators who are rarely absent and their efficiency has increased proportionately.

"After ten years experience I feel free in stating that no company interested in creative enterprise in the Philippines has anything to fear for lack of labor, if its officers will take the pains to study local conditions, exercise reasonable patience in intelligent training, and provide the best possible supervision."

thrust usually predominates. The top and bottom halves of the thrust-block have independent gear for moving the rotor for the adjustment of clearances. This gear consists of external worms and worm-wheels operating an internal screw, engaging the thrust-block.

The manoeuvring valves are assembled in front of the engine, and are fitted to seatings built on the tank top. All the valves are of self adjusting double beat type having vertical spindles. This arrangement gives freedom from all obstructions, and enables the Engineer on watch to handle the whole engine in his hands, while keeping free observation to all the auxiliaries.

The condensers, two in number, with steel plate shells, are placed in the wings of the ship. Special buffling arrangement is provided in the condensers to increase their efficiency, and the Parsons vacuum augmentors are fitted to maintain high vacuum. The condensing water is supplied by two powerful circulating pumps of Mitsu Bishi design, and there are two Messrs. Weir's twin air pumps of latest design.

Owing to the low temperature of the hot-well consequent upon the attainment of high vacua it is becoming more important to consider the economy which may be attained by utilising the latent heat of the exhaust from the auxiliaries. With this end in view a large exhaust steam feed heater has been fitted, through which the feed water is circulated on its way to the boilers. The feed water is passed through four of List and Munn's patent gravitation filters, and is delivered to the boilers by Weir's four pumps.

Two of Weir's direct-acting pumps are fitted for supplying oil under pressure to the main bearings and thrust-blocks of the turbines. The forced-lubrication pumps draw from the drain tank and discharge the oil to the bearings through the tubes of a cooler, around which sea water is circulated by an independent pump of the Weir's type.

Steam turning gear is arranged on the aft bulkhead of the turbine room, and is capable of turning all three shafts at the same time, or each one separately as may be required.

The engineers' workshop is fitted with a number of modern machine tools, driven by an independent steam engine.

The auxiliary machinery consists of two dynamo engines, one Halls' Co. refrigerating plant, and pumps to supply salt and fresh water on deck, for bath, sanitary purpose and for wash deck and fire extinguishing. There are also powerful bilge pumps and ballast pumps. Two Weir's evaporator, each capable of making fifty tons of fresh water, are fitted in engine room, and two fresh water distillers are installed for making drinking water.

The boilers are arranged in two compartments, each of which has a separate funnel, and there are six large single ended Scotch boilers in the fore boiler room, while the aft boiler room contains seven boilers. The boilers are worked under Howdens' Forced Draft system, the air being supplied by four large fans each driven by an independent enclosed engine. The funnels are of elliptical section, each rising up to a height about 120 feet from keel, and consist of inner funnels and outer casings, the spaces between are utilised for ventilating the boiler room. The boiler rooms are almost similar except that the aft one has one more boiler, and as are arranged to have free supply of coal to every boiler. Four See's ash ejectors are fitted, two duplex pumps for actuating them being fitted in engine room, and there are also two sets of steam ash hoists for the disposal of ashes in harbour. Each boiler room, which is independent and water-tight by itself, is communicated with the engine room by positive motion telegraphs, having on its dials orders pertaining to the steam, feed, ash pump, etc.

THE CHAPEI WATER AND ELECTRICAL WORKS

The Chapei Water & Electricity Works started to supply water and electric light to the inhabitants of Chapei and Paoshan, the Chinese districts situated north of the foreign settlement of Shanghai on August 1, 1911.

The pumping station is situated in Chapei next to the chief depot of the Shanghai-Nanking Railway on Soochow Creek and the company's main pipes extend at present to the Szechuan building, north of the Hongkew Recreation ground. The source of the intake is Soochow Creek. To ensure an abundant water supply the creek has been bunded and dredged for a length of 200′ to an average depth of 12′ at lowest water level. An inlet pipe of 24″ diameter conveys the water from the creek into a suction well situated within the pumping house. The center of the inlet pipe is 16′ below the ground level and at lowest tide there is 6′ water above the intake rose. The suction well is 8′×6′ with a depth of 24′. From here the water is drawn by a centrifugal pump and forced into a settling tank. There are two centrifugal pumps driven directly by vertical steam engines. Each pump can deliver 3,250 liters per minute against a total head of 12 meters.

The settling tank has a diameter of 30′ and a height of 22′. The water is brought to the bottom of the tank and rises with a speed of 1 m/m per second to the top where it overflows and drops in a spray to a lower channel, whence it flows by gravity to the filterbeds. By the slow, upward motion of the water in the settling tank and the free fall through the air the greater part of the mechanical impurities is removed and the general quality of the water considerably improved. The tank was built by the Shanghai Dock & Engineering Co. from the designs of Mr. Max M. Engel, the Engineer in Chief of the Chapei Water & Electricity Works.

The Filterbeds:—There are three filterbeds each 90′×120′ with an average depth of 10′ built in masonry and cement mortar. The filtering material consists of yellow sand which is supported by subsequent layers of course sand, gravel, macadam, and big stone which are spread over the bottom of the filter. The clean water is collected by a number of cement drains which abutt into a central drain. The head of water in the filter is regulated by a telescopic outlet pipe and the filtered water is collected in the clean water tank.

The clean water tank is 80′×100′ with a depth of 16′, is built in masonry and reinforced concrete, and has a capacity of 800,000 gallons. This tank is covered by a flat reinforced concrete roof supported by 12 reinforced concrete pillars. The roof is covered with mud, and turfed serves as a tennis court.

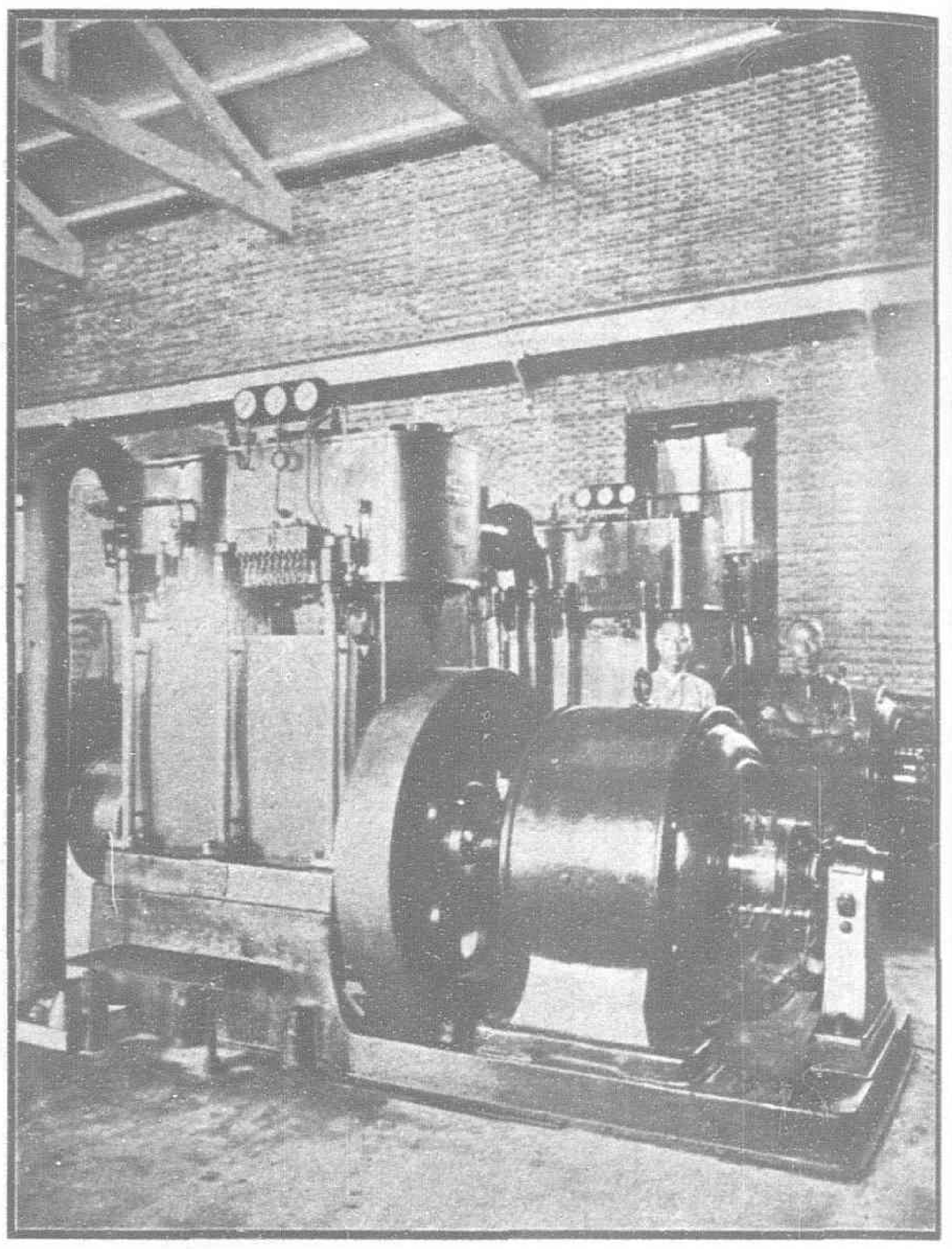
Engine plant:—The machine plant comprises three water tube boilers each with a heating surface of 60 sq. meters provided with superheaters built by Petri-Dereux, Duren, Germany.

The two main pumps are compound horizontal double acting plunger pumps built by A. Borsig, Berlin Tegel. They are capable of supplying one million gallons per 24 hours each against a total head of 140′ with 90 revolutions per minute. The electric light plant comprises two steam dynamos of 50 K. W. each with 440 volts.

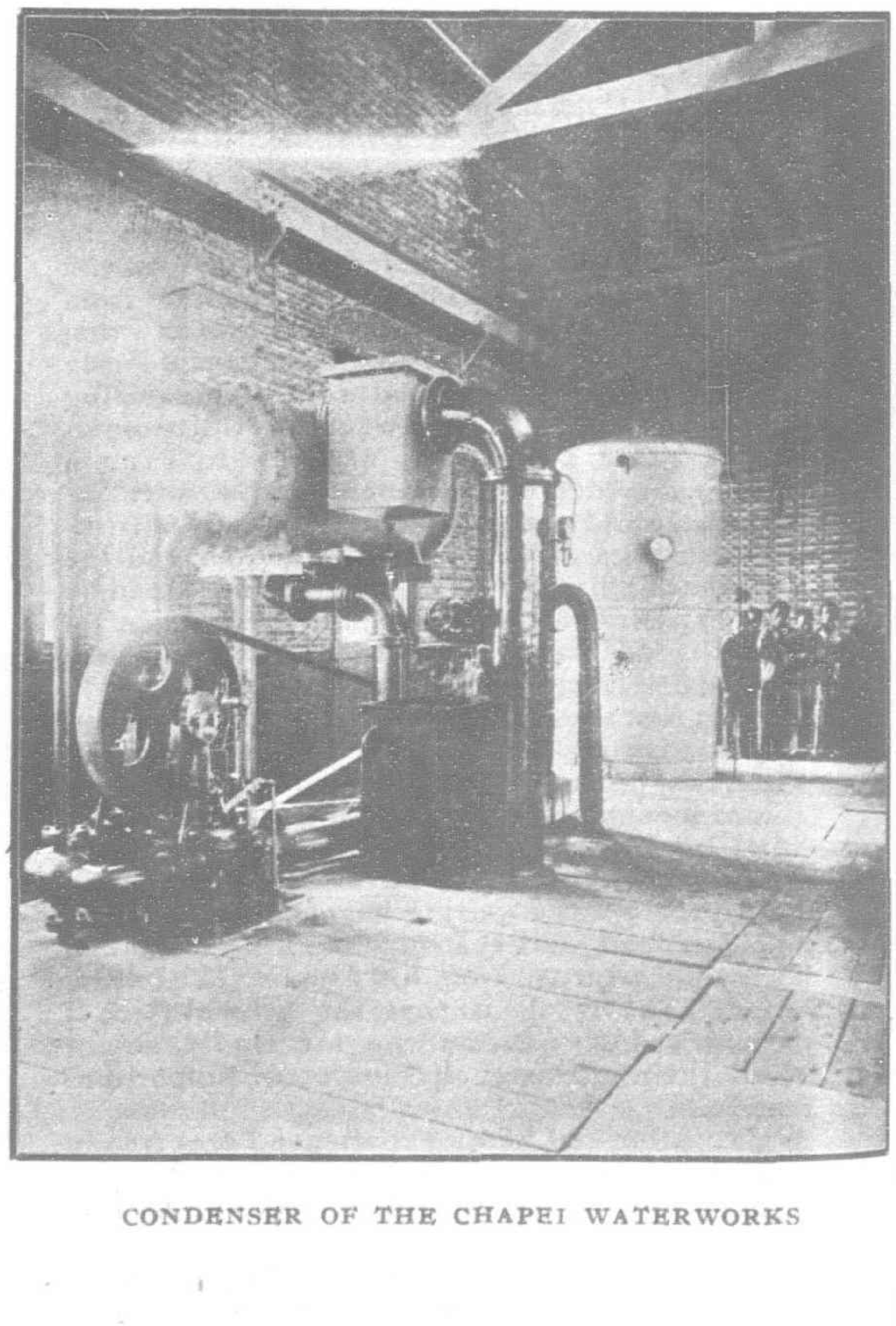
All steam engines exhaust into a central condensing plant driven by separate steam engine and capable of condensing 3,000 Kg. of steam per hour.

The chimney is an ordinary circular brick chimney with a total height of 140′. It rests on reinforced concrete foundations sunk 12′ deep and supported by 300 piles. At the completion of every five courses of bricks hoopirons are inserted in the masonry. Since the chimney was completed absolutely no settling has taken place. The distributing system has a total length of about seven miles of piping, the main pipe being 16″ in diameter.

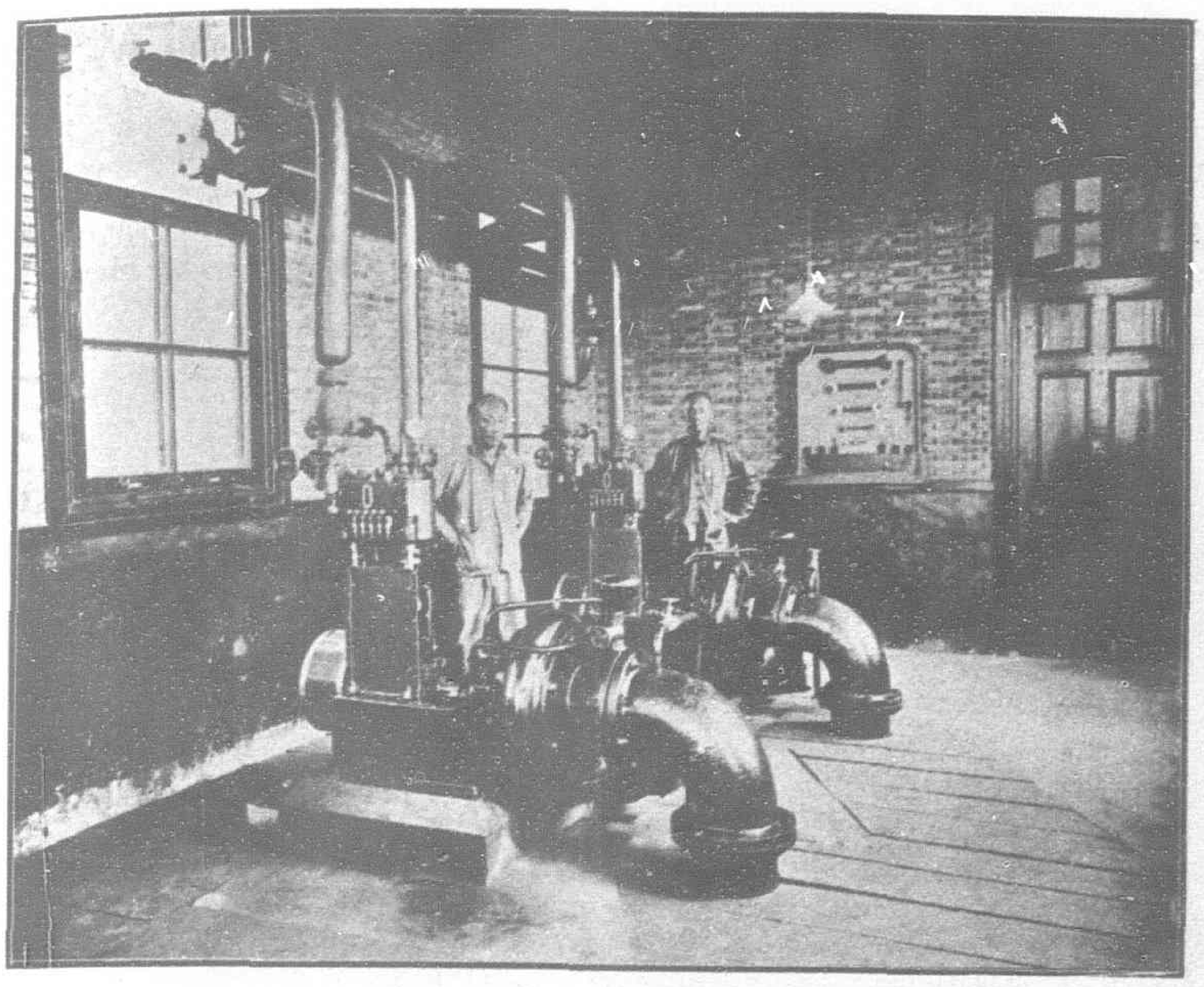
The water tower which is in course of construction is situated on the North Honan Road extension 14,000 ft. from the pumping station and will have a capacity of 60,000 gallons and a total height of 130′. A pipe is being laid from the tower to the Kiangwan Race Course, a distance of over 20,000 ft. The whole piping was cast in China by the Kiangnan Arsenal, and with the excep-

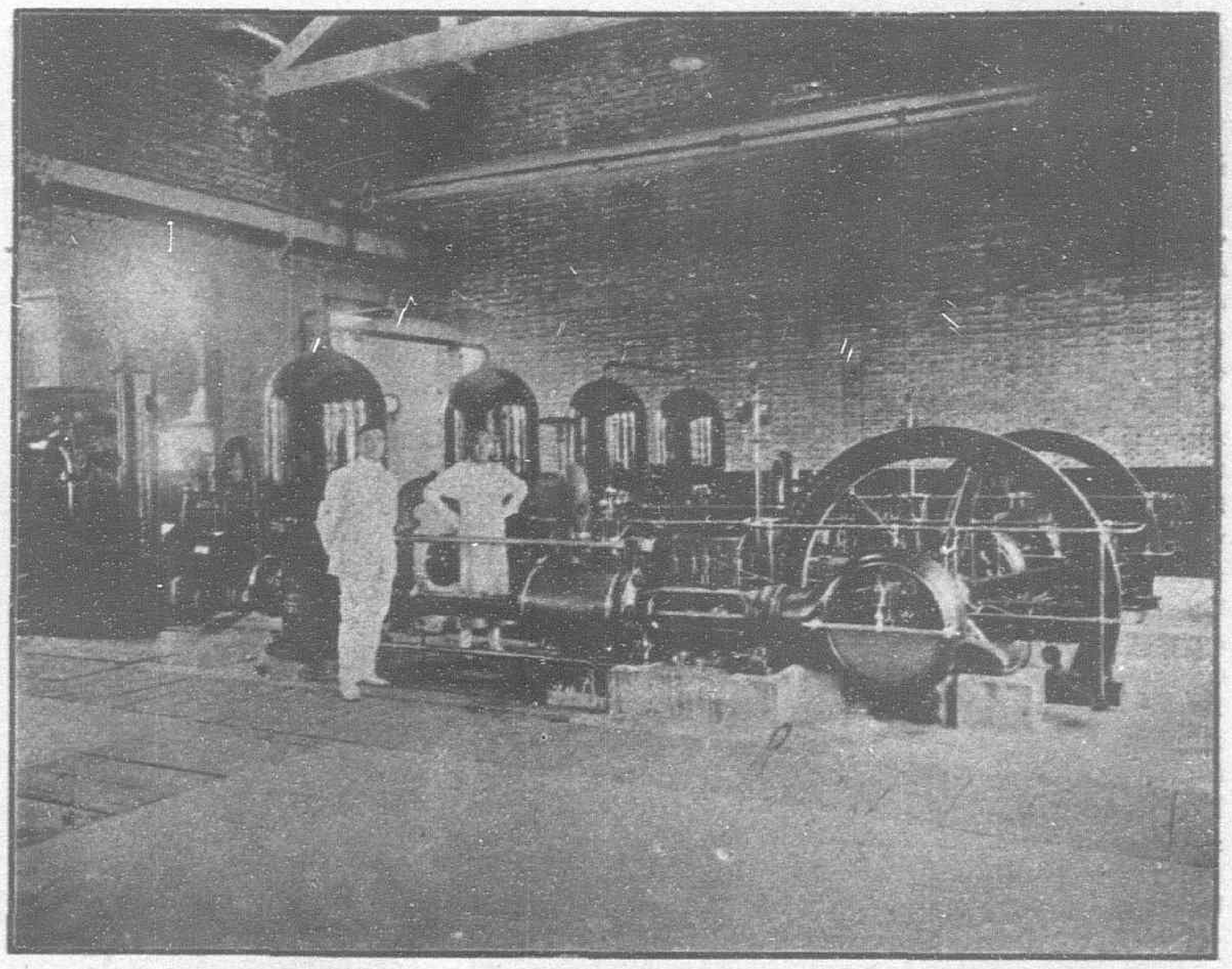


ELECTRICAL PLANT OF THE CHAPEI WATER AND ELECTRICAL WORKS

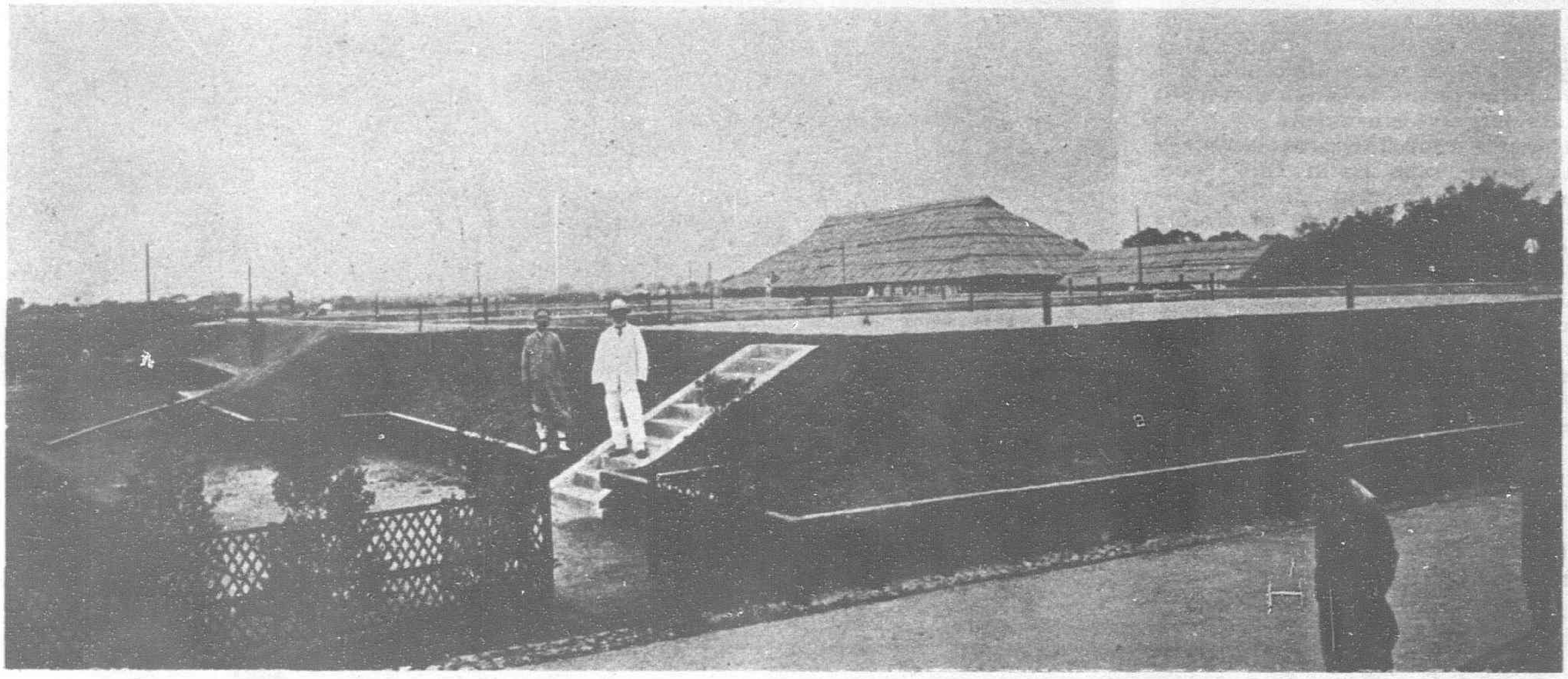


CONDENSER OF THE CHAPEI WATERWORKS

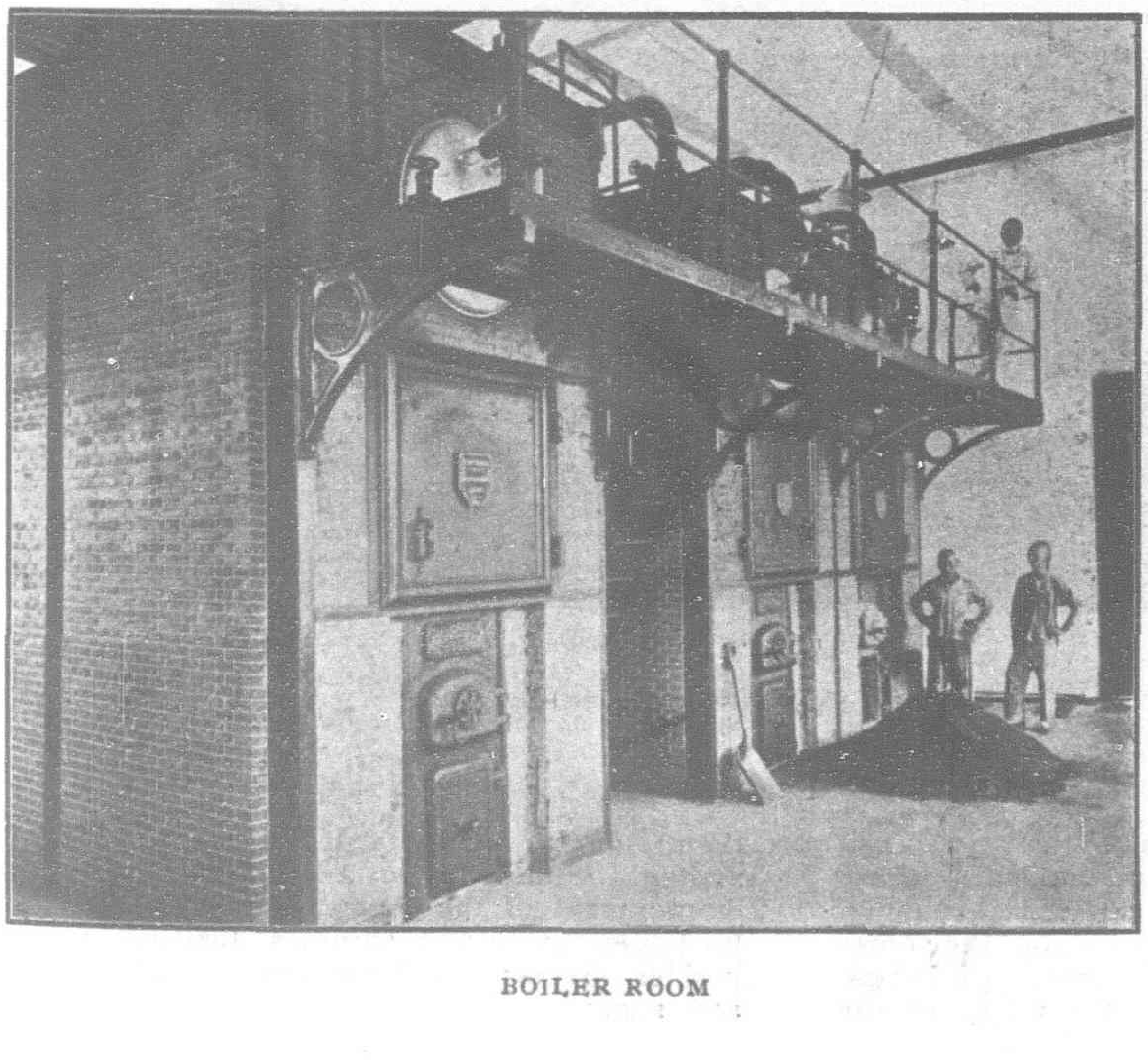




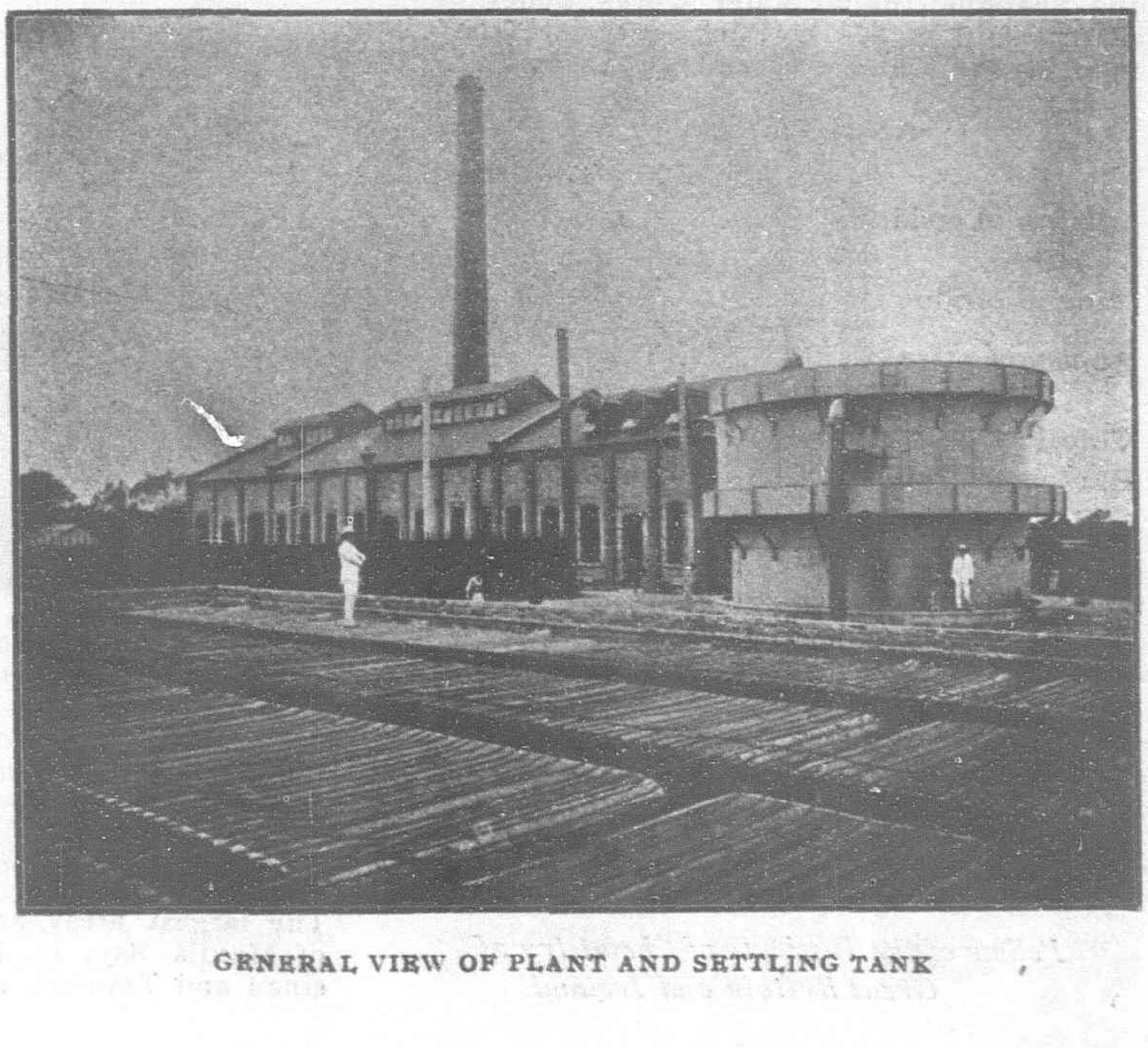
CENTRIFUGAL PUMPS AND PUMPING INSTALLATION AT THE CHAPEI WATERWORKS



FILTER BEDS, CHAPEI WATERWORKS



BOILER ROOM



GENERAL VIEW OF PLANT AND SETTLING TANK

COMMERCIAL VALUE OF THE SAP OF THE NIPA AND OTHER PALMS

Under the caption, "The Alcohol Industry in the Philippines," a valuable contribution by H. D. Gibbs, B. S., of the Laboratory of Organic Chemistry of the Bureau of Science appears in the Philippine Journal of Science covering the history, processes and commercial statistics of the alcohol industry developed in the distillation of saps from different palms indigenous to the archipelago and the result of investigations made to determine the adaptability of these saps for the manufacture commercially of sugar, starch, vinegar, etc.

The importance of the alcohol industry in the Philippines has been greatly increased in recent years by its use commercially in denatured form. Accurate figures gathered from the report of the Internal Revenue Bureau are available placing the annual manufacture of distilled liquors at 10,000,000 proof liters approximately with an estimated consumption of 1.36 liters per capita.

Of the total amount of alcohol and alcoholic beverages 93% was produced during the fiscal year 1910 from the saps exuding from nipa palms. A total of 9,700,000 proof liters of alcohol beverages were produced from 90,000,000 liters of sap handled by 68 distilleries. About 22 beverages are manufactured from the rectified alcohol of which anisette, anisado, gin, vino de coco and vino de nipa are the most popular and vary from 10 to 55% alcohol. Besides these, undistilled but fermented saps of the palms of which no record is available are largely consumed.

Mr. Gibbs writes that the production of alcohol from palm saps is, at this time, developed to only a fraction of its possibilities as vast areas of palms admirably adapted and easily accessible are yet untouched by commercial exploitation.

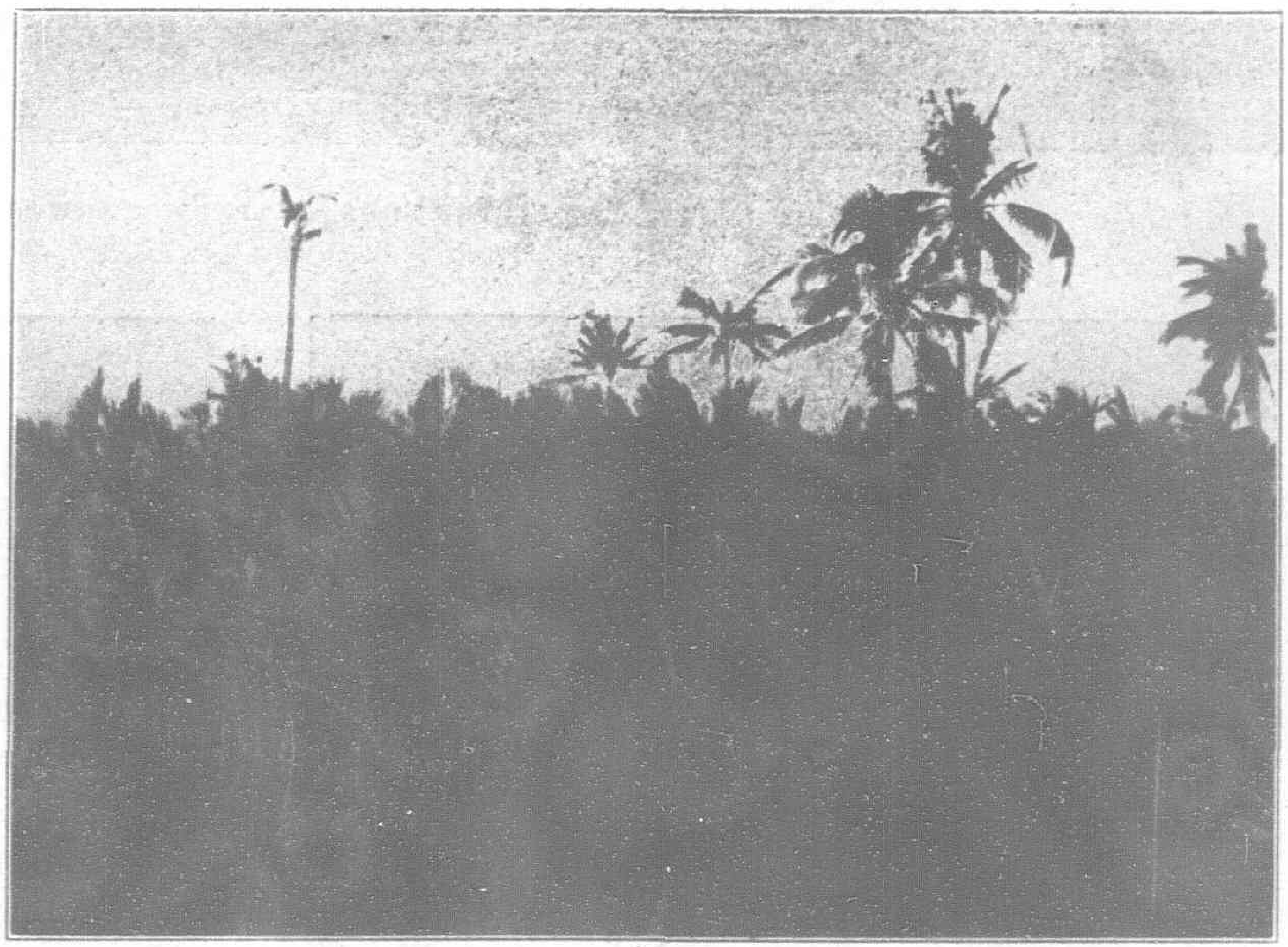
In the matter of cost of manufacture he submits a comparative table of cost in U. S. Currency demonstrating that of 16 kinds of raw material used to produce alcohol the nipa sap at $0.005 por liter equivalent to 6.5% alchool, is the cheapest, costing 0.015 per litter at 100 proof and 0.27 at 180 proof. Other factors serve to make the nipa sap a most desirable material among which is the fact that it ferment with great ease and rapidity in the ordinary course of gathering and transporting to the distillery and in less than twenty hours the liquor is ready to be pumped into the stills. One plant operating but twelve hours a day manufactures 93% alcohol 186 proof at a cost of 0.05 U. S. per liter.

The nipa palm grows along the mouths of tidal rivers in low, wet lands subject to overflows of brackish water as the tide rises each day and will not thrive in localities where either fresh or sea water alone is available. The largest areas are found along the shores of Manila Bay, in the Provinces of Pangasinan and Tayabas, and in the valley of the Cagayan in Luzon, and the islands of Panay, Samar and Mindanao. These swamps which to the unitiated appear of no value, gives a profitable crop when properly exploited and offers unusual attraction to capital particularly in the production of alchool.

The various parts of the nipa palm lend themselves to a variety of uses in the islands, among the most important of which is the employment of the general use of the leaves for house thatch and shingles, matting, etc., besides the sap for beverages, alcohol, etc., and sugar.

Photograph by Martin.

CULTIVATED NIPA SWAMP, BULACAN



Photograph by Martin.

UNCULTIVATED NIPA SWAMP, LEGASPI

---

tion of the machine plant, all the materials have been bought locally. The capital was provided by the Chinese Government and the works were planned and constructed by Mr. Max M. Engel, the Engineer in Chief of the Shanghai Inland Water Works, under the directorship of Mr. Li Ping Shu, the chairman of the Chinese Municipal Council.

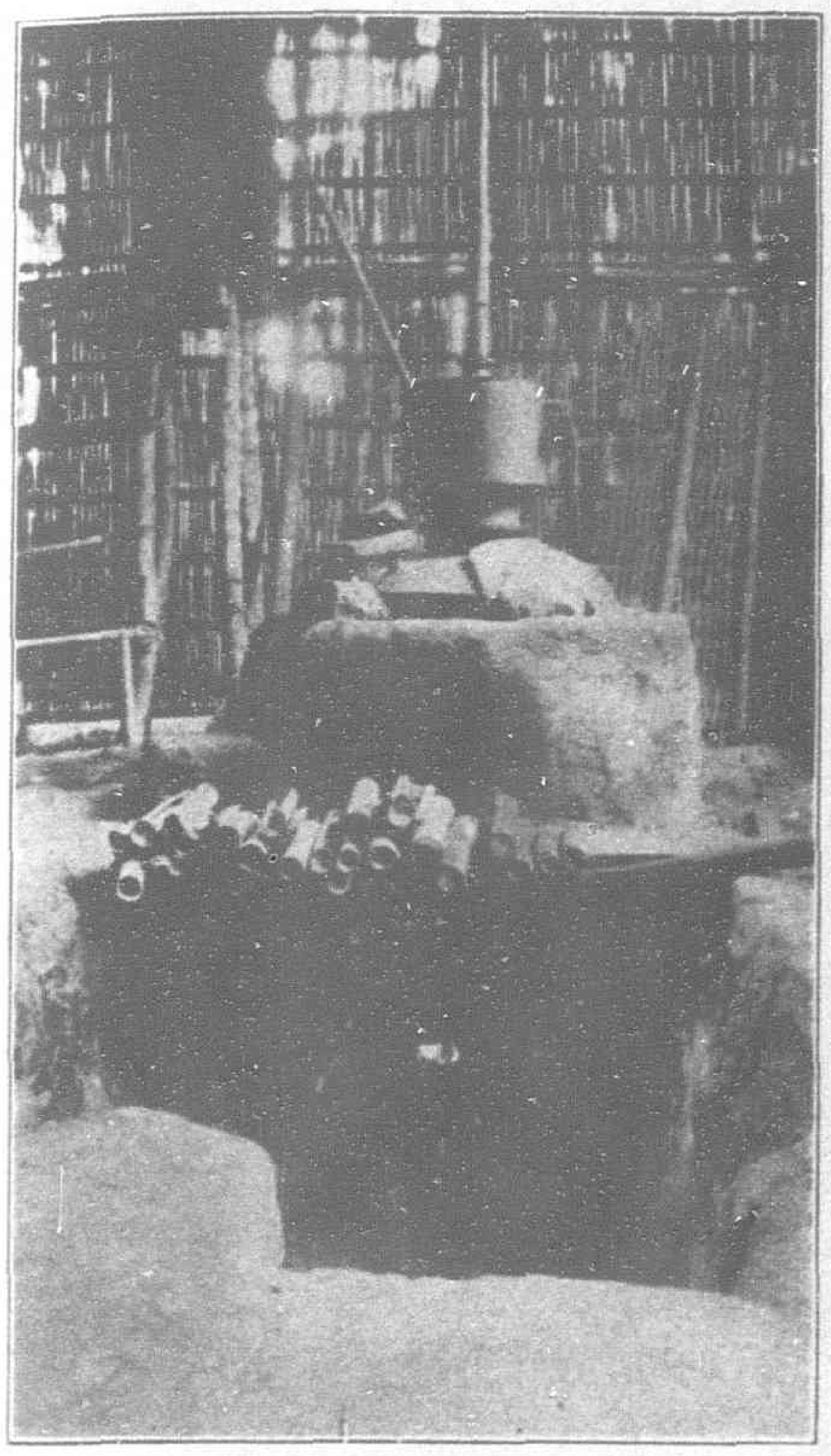
ANALYSIS

		Parts per 100,000
Total solid residue		—15.2
Volatile		—4.2
Mineral residue		—11.0
Ammonia	(free)	Traces
,,	(Albumenoid)	—0.018
Chlorine		—2.5
Hardness	(Total)	—9.6 degrees
,,	(Temporary)	—7.6 ,,
,,	(Permanent)	—2.0 degrees
Sulphates		Traces
Nitrates		Traces
Nitrites		None
Phosphates		None

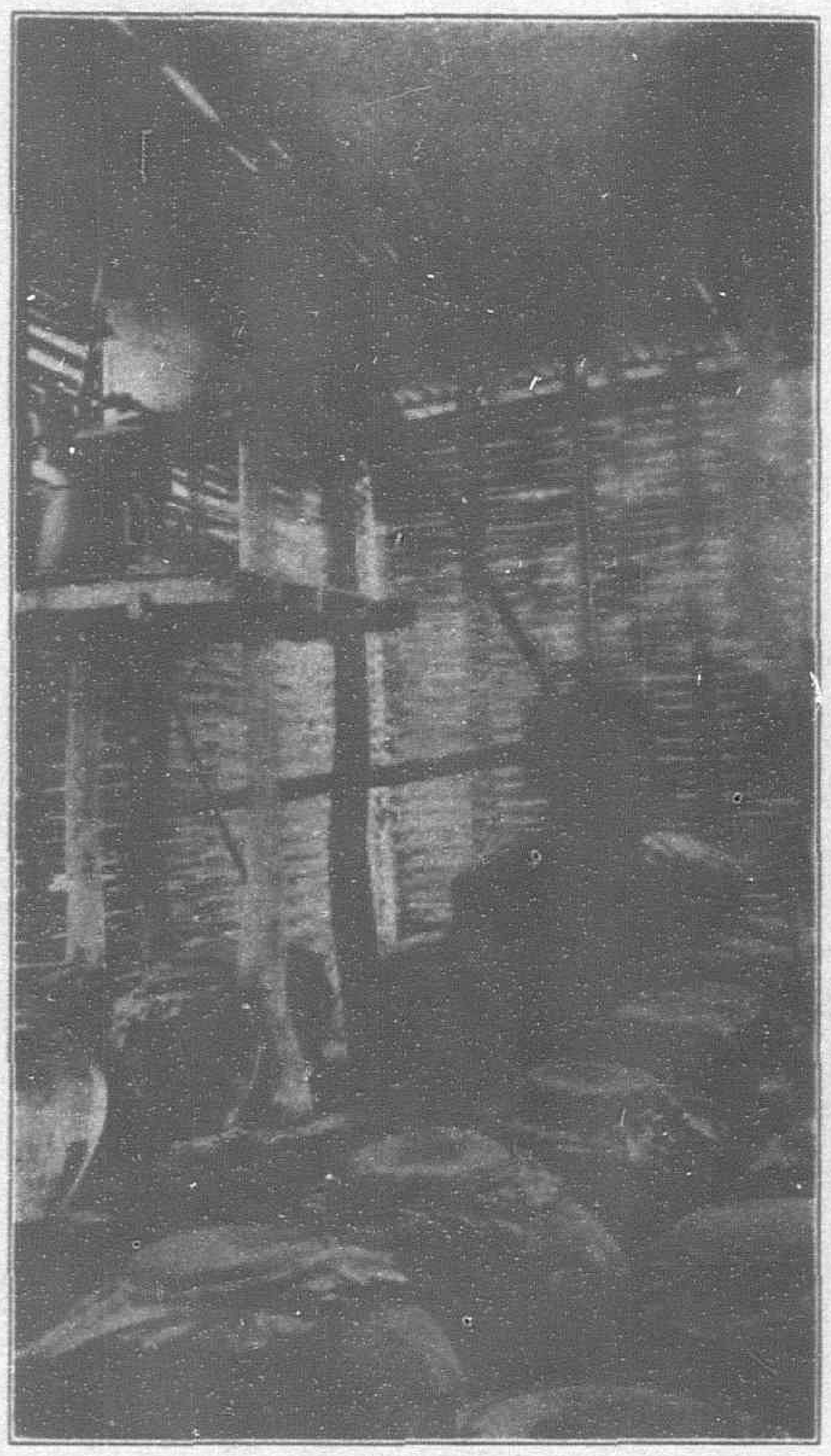
The above sample of water is perfectly clear and judging from the chemical analysis is an excellent water for domestic and technical purposes.

L. W. DUPRE, m. p.

Fellow of the Institute of Chemistry of
Great Britain and Ireland.



STILL, CONDENSER AND FIRE BOX AT MAJAYJAY DISTILLERY



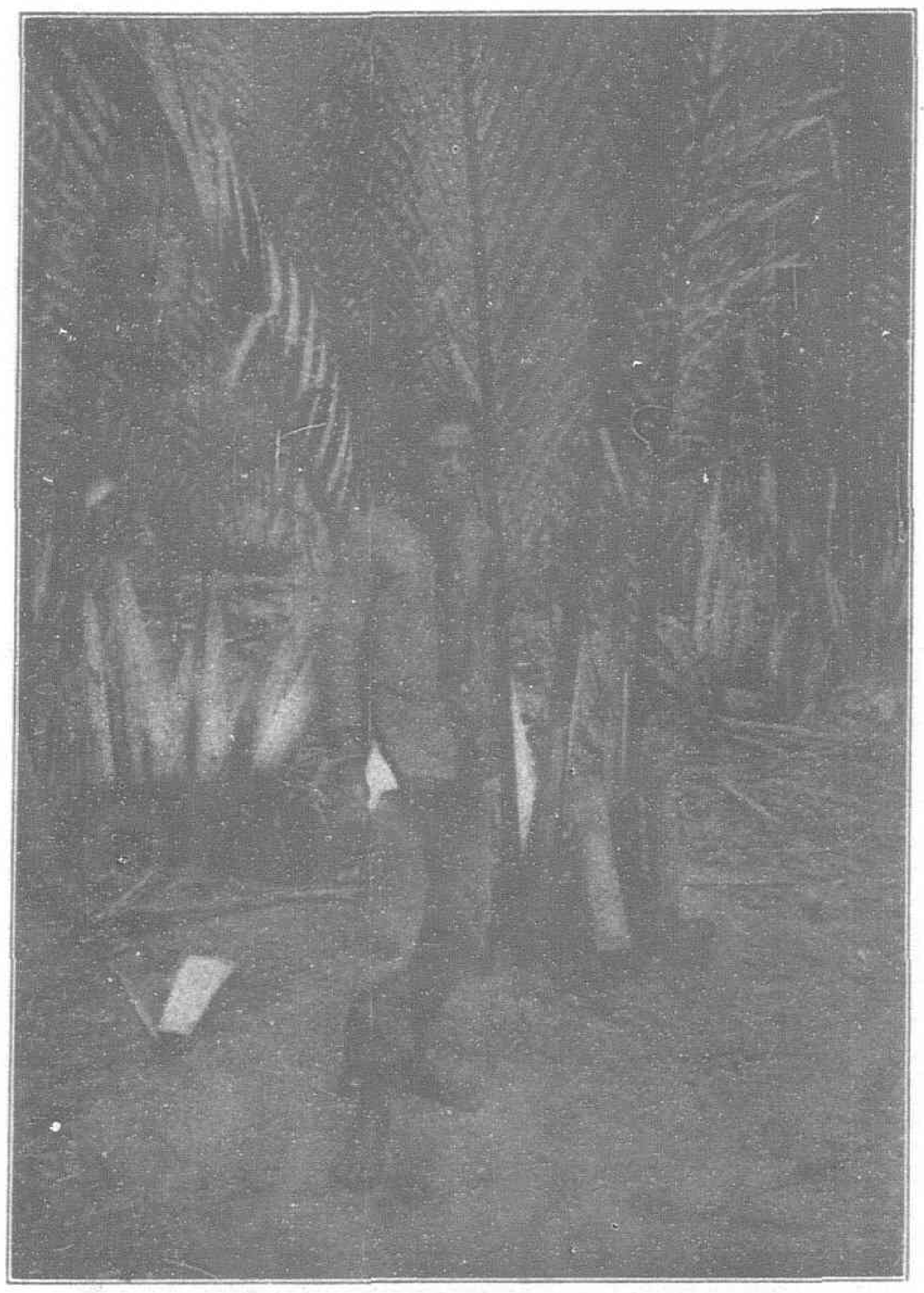
STILL, CONDENSER AND JARS OF TUBA

BURI PALM WITH LADDER TO COLLECT SAP

SMALL GROVE OF COCONUT.—THE BAMBOO BRIDGES FROM TREE TOP TO TREE TOP ARE PLAINLY SHOWN

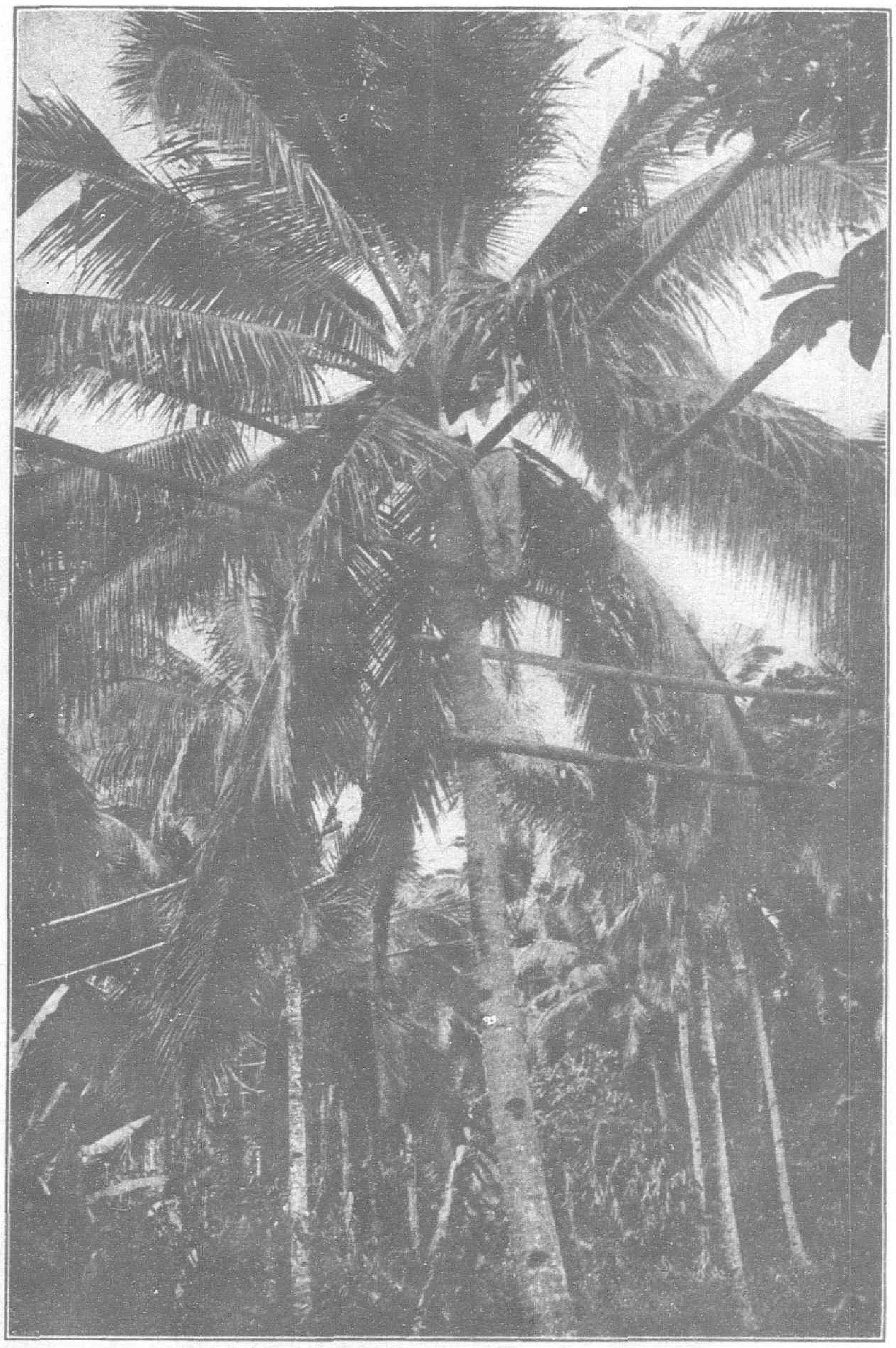
One of the most important nipa districts in Luzon includes about 6,450 hectares worked for sap on the shores of Manila Bay. It is divided for working purposes into sections of one hectare each averaging at per cent from 700 to 800 producing plants in charge of from one to more men, usually two, who are responsible for the care of the hectare of plants and the delivery of the *tuba* to the distillery.

Four years after planting the seed, the nipa bears small fruits but is not tapped for its sap until the 5th year. As the nipa sends its inflorescence up from the base and hence near the ground the flower stock is conveniently situated for gathering the sap. Some time after the fruit has formed, the stalk is cut across its top, usually just below the fruit, and each day a thin slice is removed to keep the wound fresh and facilitate exudation. The sap is collected in bamboo joints with a capacity each of two liters hung upon the stem. One stalk normally flows for above three months. In some sections the flower is cut before the fruit forms and under this treatment the yield increases but the flow is reduced to one and one half months. The usual *tuba* season in all covers about six months beginning in August and July, but it may be extended throughout the year



COLLECTING NIPA SAP, SHOWING COLLECTOR AND TWO BAMBOO JOINTS IN POSITION TO RECEIVE THE SAP

NIPA PALMS IN FRUIT



NEAR VIEW OF COCONUT GROVE, LUISIANA, LAGUNA.—ON THE LEFT SIDE OF THE TRUNK AND ON THE LEVEL OF THE NATIVE'S HEAD ALMOST HIDDEN BY LEAF STEM'S IS HUNG A BAMBOO JOINT ATTACHED TO A FLOWER STALK FOR COLLECTING THE SAP—THE BAMBOO BRIDGES FROM TREE TOP TO TREE TOP FACILITATE SAP GATHERING

by cutting a portion at a time and bringing other plants into production as the first are exhausted. No definite estimate of the length of time a nipa palm may fructify and give tuba is available but there is authority for believing that a plant will survive 50 years of this process.

An average producing plant is estimated by different authorities to yield 1.25 liters daily and 50 liters in a season. As the result of careful experimentation, Mr. Gibbs places the average daily yield of sap per plant at .58 liters, the season yield per plant at 43 liters, and the return for a hectare for the season of 87,000 liters.

The author has demonstrated that a large proportion of the fermentable sugars is lost through careless and improper methods employed in handling the sap and places the sucrose in nipa sap at an average of from 14 to 15%.

The yield of alcohol from the sap according to the returns for 1910 (90,000,000 liters of sap distilled producing 9,023,323 proof liters of alcohol) varies from 4.1 to 7.5%.

The estimated cost arrived at from tests of two distilleries placed one at $0.06, U. S C., and the other at $0.048 per liter. While the selling price in Manila including a tax of $0.125, U. S. C., a liter averaged from $0.31, U. S. C., to $0.36 U. S. C. Mr. Gibbs sees great opportunity for large returns for more economic methods of transportation, distillation, etc., so as to prevent the average loss of about 50% in alcohol yield as is now the case in many distilleries.

The earning capacity of a hectare of nipa swamp even under present conditions sometimes reaches $750, U. S. C., a year. This could be greatly enhanced by more improved methods of employment, supervision of the labor and modern methods of distillation. The cost of maintenance is practically nothing and the life of the producing plant so prolonged that there is a steady, never ending return from the nipa.

Sugar.—In his paper Mr. Gibbs refers to extensive investigation made as to the adaptability of the nipa sap as a source for the profitable manufacture of sugar. He says;

"The sucrose content of all of the plants which I have investigated ranged from 12.5 to 17.0 per cent and I believe a fair average lies between 14 and 15 per cent. The purity is approximately 90 per cent.

Collection of sap.—An efficient method for preserving the sap is the first essential. Lime answers the requirement perfectly. Sap collected in the bamboo receptacles ordinarily employed by the natives remained unchanged for a longer period than ten days when the receptacles, before placing upon the plant stems, were coated on the inside with milk of lime by dipping into a rather thick mixture of lime and water. Since this preservative enables the sap to be collected and transported to the central refinery in an unchanged condition, the principal difficulties connected with such an industry are met, for the sap in its composition so nearly resembles cane juice that no special changes are necessary in the process of refining.

"*Sugar boiling experiment.*—On December 14, 1910, at 6 o'clock in the evening, twenty new bamboo joints were coated on the inside with a thick mixture of lime and water and immediately placed in position to catch the sap from as many nipa palms. The lime employed was manufactured at the distillery by burning oyster and other shells. At 6 the next morning, the sap which had flowed during the twelve hours was collected in a glass demijohn and transported to Manila to the laboratory. It was filtered twenty-eight hours after collection, and the clear filtrate measured 15 liters.

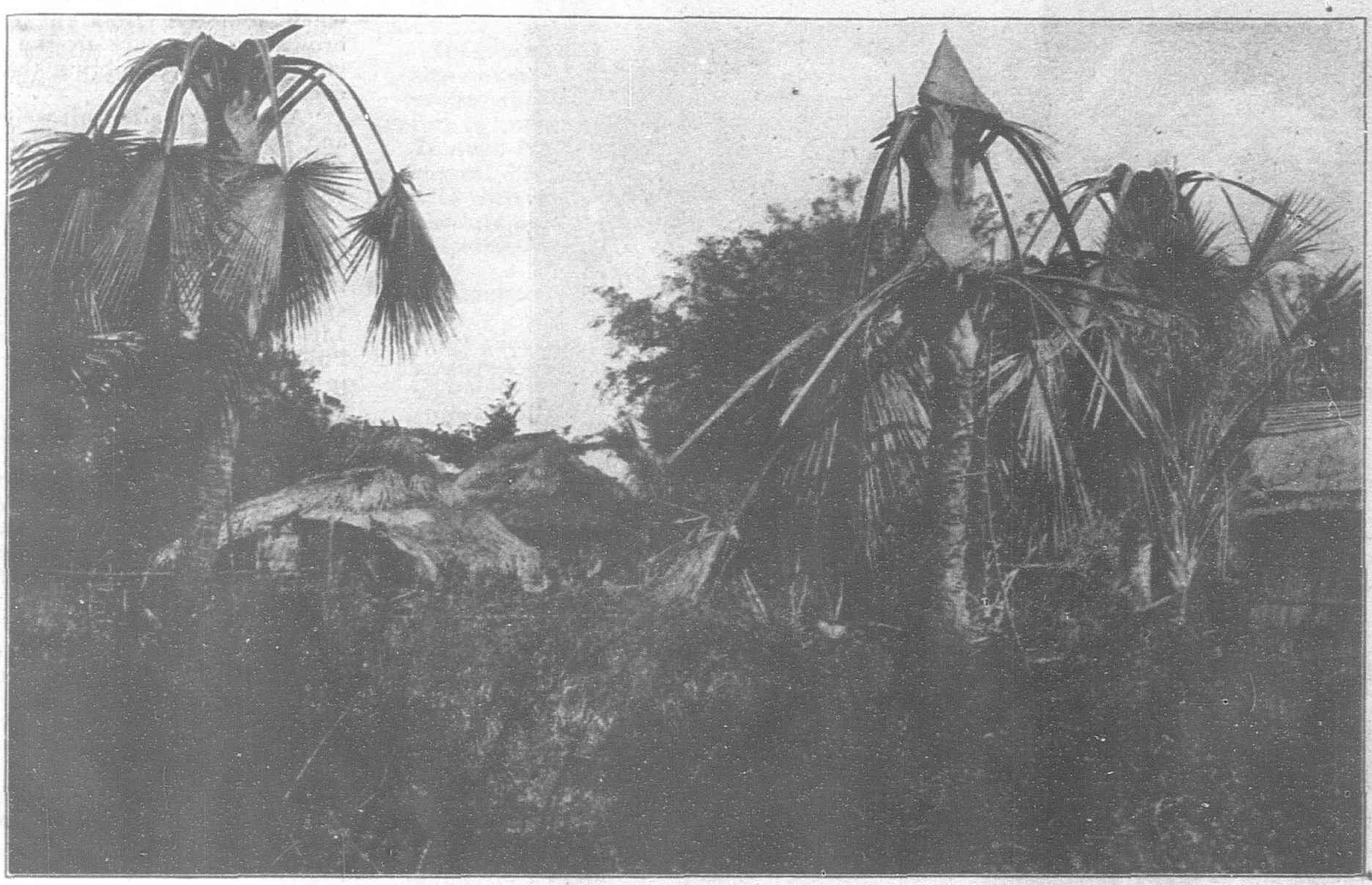
Four liters of this liquid were heated to boiling in a large porcelain evaporating dish and carbon dioxide run in until the alkalinity was reduced to 0.10 gram calcium oxide for 100 cubic centimeters of solution. The solution was then filled and analyzed.

The process of evaporation was then continued and the alkalinity further reduced with sulphur dioxide to 0.011 gram calcium oxide for 100 cubic centimeters of liquid. The solution was again filtered and analyzed. This solution contained, according to the analysis, 236 grams of sucrose.

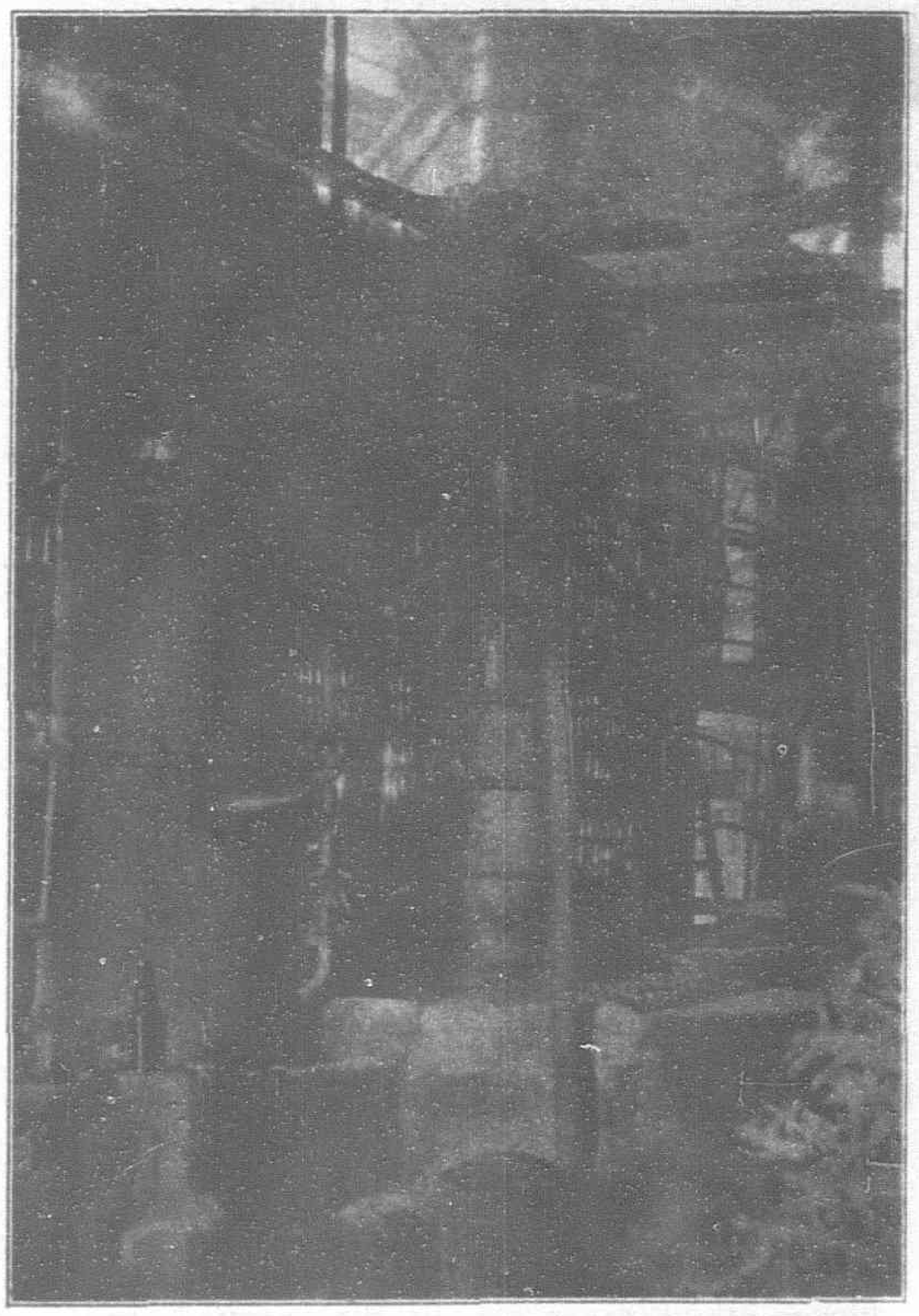
On boiling down to a massecuite and cooling, crystals of good grain were obtained. These, on drying in a hand centrifuge and finally in an air bath at about 90°, weighed 157 grams, were pure white, and polarized at 96.8 per cent.

The molasses and washings were boiled down to a second massecuite and treated in the same way. A yield of 79 grams of very light yellow sugar polarizing at 93.8 was obtained. The second molasses was light yellow, measured 20 cubic centimeters and polarized at 58.6. A third sugar could easily have been crystallized from it if the volume had been sufficient. The losses were entirely due to the numerous samples taken for analysis during the course of the work and to the handling of small quantities of material in the centrifugal machine, which was much too large for the samples.

Ten days later, on December 24, 1910, a second portion of the same raw material was treated in practically the same manner. Two liters of this solution, containing theoretically 276 grams of sucrose, yielded 210 grams of first sugar, which was almost pure white and polarized at 96.8. The quantity of molasses was too small to handle successfully

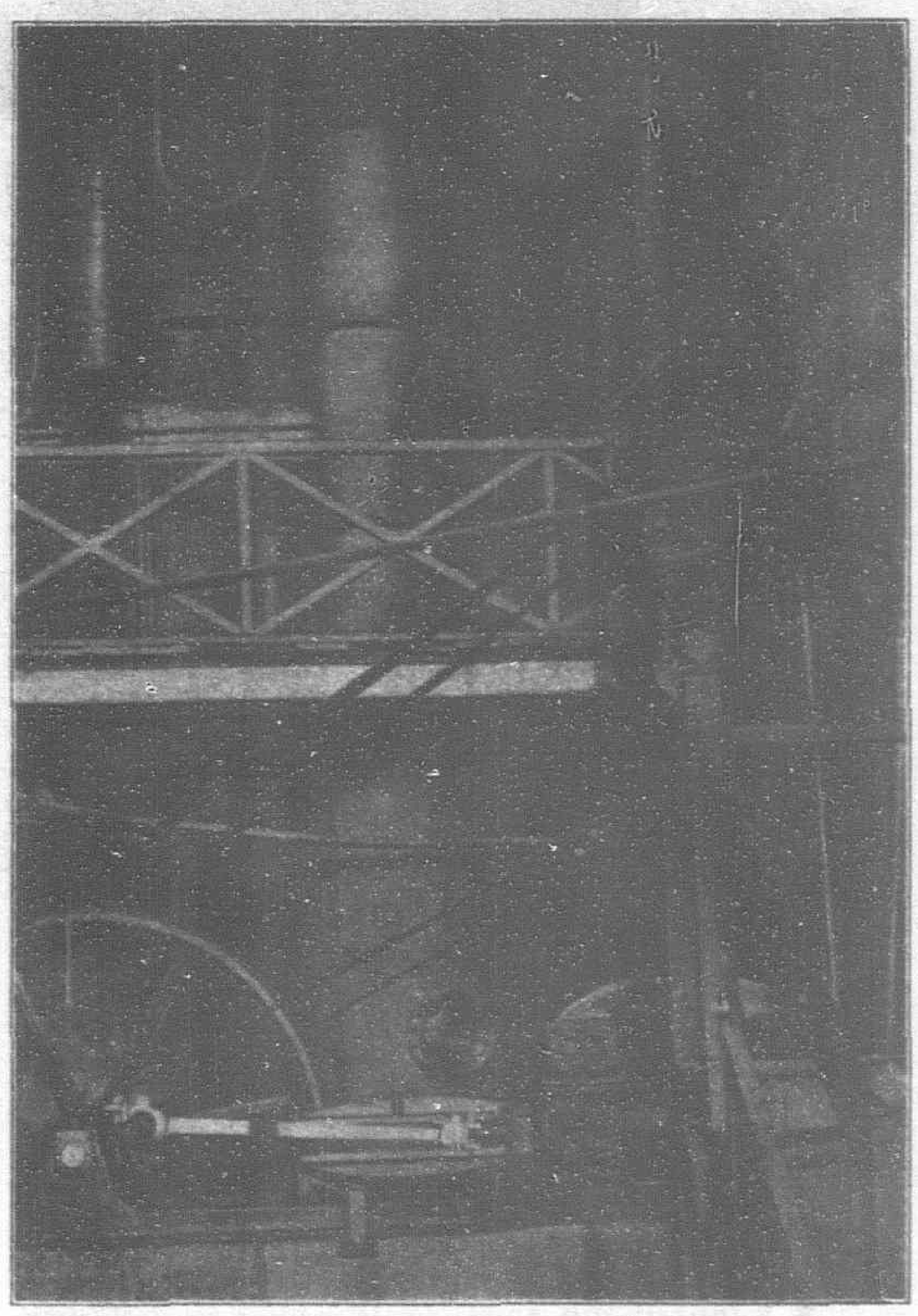


BURI PALMS TAPPED FOR THEIR SAP



Photograph by Martin.

INTERIOR OF PROVINCIAL DISTILLERY



RECTIFYING COLUMN IN DISTILLERY OF THE COMPANIA GENERAL DE TABACOS DE FILIPINAS, MANILA

COCONUT PALM

in the apparatus, so no further attempt was made to refine it, although with larger quantities it could easily be handled

"The refining of this sap will require the ordinary equipment of a sugar mill with the exception of the crushers, namely, a lime kiln to furnish both the lime and the carbon dioxide, clarification, sulphur, and concentrating apparatus, filter presses, centrifuges, steam generating plant, dynamos, and motors. A great saving over the cane will be the omission of the crushers. The nipa districts are well suited for cheap transportation of fuel, limestone; and the various supplies through the waterways, and for the shipment of the product.

"*Estimates of production.*—The investigations of a number of individual trees, previously described, show that a seasonal production of 43 liters of sap is about the average.

"On the basis of 2,000 trees per hectare the sap-yield is 86,000 liters per annum per hectare. Estimating 14 per cent sucrose in the sap or, to be on the side of conservatism, 12 per cent recoverable sugar, the yield per hectare will be 10,428 kilos of 96 per cent sugar valued at 0.16 peso (subject to market fluctuation) per kilo, at 1,668.48 pesos. A hundred-ton sugar mill would probably be kept running 180 days of the year on the product of 750 to 1,000 hectares. The actual figure derived from calculation is 745 hectares.

"Since the cost of refining will probably be less than that for cane and since sugar is an expensive raw material for the manufacturer of alcohol. I am strongly of the opinion that more profit is to be made from the nipa lands through the establishment of sugar refineries than distilleries.

"I fully realize that great claims which have never been realized have been made for the profits to be derived from the use of other palms, *Arenga saccharifera* and the *Caryota urens*, in Java and India, for sugar production on a commercial scale attractive to the investment of European and American capital. However, in the case of the nipa, many of the difficulties encountered with the other palms do not exist. Some of the points of especial advantage to the *nipales* are as follows: The swamps already exist in a state ready to bring them into active production merely by thinning, or, in the case of the swamps already employed in the alcohol industry, this work is already well under way; many large areas are not now put to any use and are to be had for a small investment; the plants reproduce themselves and it is probable that each plant is capable of producing continuously for fifty years; the flower stems are close to the ground and the work of gathering the sap is quickly and easily performed; the producing plants grow very close together and the production per hectare is large; transportation of the sap is cheaply accomplished through the numerous waterways.

"Before concluding, I must point out that while these estimates are the result of accurate laboratory and field investigations, they must be substantiated by experimental work on a small factory scale. I sincerely trust that some one will be found willing to make the initial investment to test these figures. If no unforeseen difficulty is encountered, I believe splendid returns will accrue.

"*The Fruit of the Nipa Palm.*—The seed, when soft and jelly-like, is eaten raw or after preserving with sugar sirup. It is white when removed from the carpel and turns brown on exposure to the air. The flavor is agreeable, resembling that of meat of the coconut.

"An average size fruit weighed 9,541 grams, and consisted of 8,960 grams of husks and stems and 575 grams or 6.1 per cent of edible seeds."

Mr. Gibbs also reviews the commercial value of the cocoanut palm as a source for alcohol, sugar and vinegar. The fermented sap is utilized as a beverage among the islanders and when distilled produces the vino de coco. Little or no sugar is made from it in the Philippines, although the percentage of sugar in cocoanut sap is stated by Ceylon authorities to be 9 to 13% and the natives there have produced a crystallized sugar from this source for time immemorial. The height of the trees make the collection of sap much more difficult than from the nipa.

The buri palm, prominent as the source of material for the buri hat of which there is a large number exported from the islands, is also referred to by Mr. Gibbs as valuable for its sap and trunk. The sap may be developed into fermented drink, vinegar, alcohol, syrup and palm sugar while from the trunk of the tree starch is prepared. A similar review is made of the sugar palm. Mr. Gibbs' paper is very comprehensive, covering in detail descriptions of processes of manufacture, experiments made upon which to base his conclusions, and altogether contributes a valuable article on the commercial possibilities of the different species of the palm as found in the Philippines under well directed enterprise.

The illustrations accompanying this article are published by courtesy of the Director of the Bureau of Science.

THE WESTERN ELECTRIC'S NEW INTER-PHONE BULLETIN

"The selection, installation and wiring of inter-phone systems" is the title of bulletin No. 1105, a new thirty-six page publication which the Western Electric Company has just issued. It is the most complete and comprehensive bulletin ever written on the subject of inter telephone systems and is illustrated with sixty-six cuts and diagrams. Twelve different systems are described in this bulletin, and in it are also shown sets ranging from the No. 1327 type, a set used for two to six-party common ringing and common talking service, to the No. 1335 type, a set used for twenty-four station installations where selective ringing and selective talking are desired. This bulletin tells how to choose the best system for every conceivable service, and gives valuable information on the installation of the sets.

The section of the bulletin describing the various methods of running and connecting cable, the method of installing the sets, and forming the cable at the cable terminals, is especially valuable, as it is profusely illustrated and shows just how the work is to be done.

Two new systems are shown, one a selective ringing, common talking set made both in four and eight button types to accommodate five and nine party service, the other a selective ringing, common talking set for limited service. This limited service is one where, from a master station a call may be made to any outlying station, and the master station may in turn be called from any outlying station.

FAR EASTERN RAILWAY NEWS

CHANGSHA-CHU-CHOU SECTION OPENED.—On September 10 a special train of eight coaches made a through trip from Changsha, Hunan, to Chuchou, a distance of approximately 35 miles. The permanent bridge work over this section has not yet been completed, but the distance was covered in about two hours. A service of one train daily each way is maintained.

STANDARD GAUGE FOR FORMOSA.—The program of railway construction on the Imperial Taiwan Railways includes the widening of the present gauge to standard and to double track the Keelung-Taipeh section.

RAILWAY TO BAGUIO.—The proposed construction of a railway from Aringay on the Northern line to Baguio by the Manila Railroad Company is expected completed within two years and in the meantime the old road to Baguio from Camp One will be utilised, by means of a narrow gauge auto-traction tramway as far as Camp 4 and from that point by automobiles to the summer capital. The latter improvements will be completed before the 1912 season.

THE PHILIPPINE RAILWAY CO.—On September 20, E. G. Carrera assumed the duties of acting auditor of the company on the departure of A. Strausz jr, auditor, for the United States on leave. R. R. Hancqck, secretary of the company, has undertaken the duties of acting general superintendent with headquarters at Iloilo. He has also assumed charge of construction work, relieving B. B. Harris, assistant chief engineer for J. G. White & Co. who returned to the States upon practical completion of construction work. H. A. Glover, secretary to W. B. Poland, vice-president and chief engineer, in addition to his other duties, was appointed acting trainmaster vice Gifford Jones who is absent on leave.

RAILWAY MATERIALS IMPORTED INTO FORMOSA.—Trade reports for 1910 state that the import of rails was as follows:—Germany 9,562 tons (£55,314); United States 2,455 (£13,836); United Kingdom 3 (£72); Belgium 3 (£39). Total 12,023 tons (£69,261). And of bridge materials the principal suppliers were:—United Kingdom £23,262; United States £19,643; Germany £19,037. The small balance came from France and Hong Kong.

RAILWAY CONFERENCE AT PEKING.—The Ministry of Posts and Communications has issued a circular to the officials of the different railways in China announcing that a conference will be held at Peking on October 22 for the purpose of discussing the standardization of construction, equipment, and methods of administration and operation of all railway lines in the empire. This will include the adoption of standard specifications for rolling stock, tariff rates, control of trains, safety device, rules and regulations governing operation, etc.

THROUGH TRAFFIC FROM HONGKONG TO CANTON.—Tariff rates over the 110 miles of the Kowloon-Canton Railway are as follows: First class fare $5.00 Hongkong money; second class $2.50, and third class fares $1.25.

THE CANTON-HANKOW RAILWAY.—A. H. Collinson engineer-in-chief of the Canton-Hankow construction, has concluded an inspection of the American survey of the route made by Mr Parsons for the China-American Development Co. from Wuchang to Yochow and with some slight changes will recommend it. This section is about 150 miles in length and passes from Wuchang South through Hsiniang, Puchi, Yanglotung, Lucao, and Yunshi to Yochow. During this inspection high water, occasioned by the heavy floods, gave the engineers an opportunity to make observations of value in providing the maximum percentages of safety in construction. The contract of the terminal offices at Wuchang has been let.

CHEFOO'S RAILWAY CONNECTION.—The abandonment of the Chefoo-Weihsaw railway project and the proposal now made to substitute a line from Chefoo connecting with the Tientsin-Pukow lines at Tsining is being discussed. This line would in a measure compete with already existing railways and a large measure of opposition to its construction is anticipated.

KIOCHOW-YICHOW LINE.—A report from Peking given more or less credence is to the effect that the Deutsche-Asiatische Bank has arranged a loan for the construction of this line which, if built, would compete with the Haichow-Hsuchow line. The loan is reported to be for Tls. 8,000,000 redeemable in ten years.

MANILA RAILROAD COMPANY'S CONSTRUCTION.—Regardless of the heavy rains this company is making rapid headway on construction. The Cavite line to Naic is practically completed and work on the southern lines towards Lucena is progressing. In all there are about 650 kilometers, a large part of which is under construction to be completed by 1918. Of the through line from Manila to Lucena which is 140 kilometers in length, but 40 miles are to be constructed. A line is projected from Lucena south to Legaspi which will make over 300 kilometers from Manila to the most southern terminus.

DAMAGE FROM FLOODS.—The recent heavy floods that prevailed throughout the Philippines, China and Japan resulted in much damage and delay to railways. In the Philippines there were several washouts and traffic was delayed. The damage, however, was quickly corrected and nothwithstanding two very severe typhoons, traffic has been fully restored.

In Formosa and South, Central, and North China reports indicate very severe floods with serious delay in traffic. In Manchuria, the Liao River overflowed its banks, and owing to the low lying character of the country carried away embankments on the I. R. N. C. and the South Manchuria. The country for many miles was under water and severe damage to crops is reported. Traffic on the I. R. N. C. was suspended, but as a soon as the waters abated great activity was displayed in repair work.

SHAHO RIVER BRIDGE.—The contract for the construction of a bridge over the Shaho for the Peking-Mukden line has been let to the South Manchuria Railway Co.

CANADIAN PACIFIC RAILWAY.—At a meeting of the directors of the Canadian Pacific Railway Company dividends of 2 per cent. on the preference stock for the half-year and of 2½ per cent. on the common stock for the quarter ending June 30 last were declared. The results for the fiscal year to June 30 last were:—Gross earnings from railway and steamship lines, £20,833,561; working expenses, £13,493,595; net earnings from railway and steamship lines, £7,337,966; the net earnings of steamships in excess of the amount included in the monthly reports were £223,670; deducting the fixed charges—£2,002,214—there remains a surplus of £5,561,421; deducting the amount transferred to steamship eplacement account—£200,000—and deducting the contribution to the pension fund—£16,000—the nert revenue from railway and steamship lines available for dividend is £5,345,420. After payment of all dividends declared for the year, the surplus from railway and steamship lines for the year carried forward is £2,374,648, the special income from interest on land sales and from other extraneous assets not included in the above is £1,320,441.

ADDITIONAL LOAN PROPOSED.—The Ministry of Posts and Communications has presented a memorial requesting an additional loan of Tls. 30,000,000 from the international syndicate to be utilized in redeeming the private railway interests in cash.

TUAN FANG'S PROCLAMATION TO THE SZECHUANESE.—The Imperial Railway Commissioner, who was directed to proceed to Szechuan for the purpose of enforcing the Nationalization Decree to which local objection in the form of a serious disturbance was made by the railway officials, issued a proclamation, part of which we reproduce:

"I have been appointed to come to Szechuan solely to make known the benevolent intentions of the Throne. The troops I am bringing with me are simply for the purpose of suppressing banditti. The object of the Throne in taking over the railways is because of their great importance to the State, and because the Szechuan railway is specially difficult to construct. The construction of this road is a burden greater that the Szechuan people can bear, and is likely to reduce them to poverty before they can get through with it. As a special favor to them the Government takes over the railway and puts a stop to enforced subscriptions, proposing to provide all the necessary funds itself. The Szechuan people ought to have been delighted and grateful for this favor, but instead of that busybodies have been declaring that the Government is robbing them, and that in connexion with the loan they will lose their independence. They do not know that the North-China Railway and the Peking-Hankow Railway were built with foreign money, and that they have been extremely lucrative enterprises to the country without its losing a grain of its independence. Further the new loan agreements are much more favorable to China than those under which the previous railways were built. These things they did not inquire into, but proceeded to raise disturbances, shutting the schools closing down the markets, refusing to pay taxes and every way behaving like rebels. They did not think that genuine rebels would take advantage of the opportunity to plunder the people, to kill your sons and daughters, to burn and destroy till you all tasted the miseries of insurrection. For banditti of that sort the Throne has no mercy, and it has sent me to deal with them alone."

The proclamation further states that the books containing the names of those who formed societies to protect the railway are to be burned. It points out that, although the railway belongs to the State, it will still be the people's railway, new shares will be given for old. The proclamation concludes: 'Let there be no more trouble. Let business proceed as before. Let the taxes be paid and all be peaceful. Then can the railway be built, the Throne will be gratified, I shall be gratified and all the people of Szechuan will reap the benefit."

HUPEH RAILWAY SURVEYS.—Director General Tuang Fang has reported to Peking that a re-survey of the lines places the mileages in Hupeh as follows: from Tunghsiang gate at Wuchang to Yochow, 190 miles, from Kuangsui to Fancheng 130 miles, and from Hsiangyang to Shasi 207 miles.

TOKYO RAILWAY CO.—The report for the last six months places the number of passengers carried during the term at 99,400,681 and the revenue at yen 3,517,545.26. The following is the statement submitted and approved:

	Yen.
Net profits	1,944,788
Previous Balance brought over from accounts	22,229
Total	1,967,017

The No. 1335 type set, a metal wall set made in capacities for 16, 20, and 24 line stations, is also described, as well as the No. 19 cable terminal. In addition to these new sets, all the standard sets manufactured by the company, together with accessories and supplies necessary for the complete installation of inter-phone systems, are shown.

PHILIPPINE MINING NEWS

THE COLORADO MINING CO.—This company, which owns a splendidly developed property in Masbate, began operations this month with its 20-stamp mill and modern cyaniding plant the installation of which is now complete. The result of the first clean up is looked forward to with great interest by Philippine mining men. Work has been in progress for the last six years and from reliable sources we learn that the property is probably the most highly developed in the islands. The officials of the company while confident are reticent about making forecasts.

AUSTRALIAN ENGINEER VISITS ISLANDS.—Mr. E. Byron Moore of Messrs. Byron, Moore and Day of Melbourne made an examination of placer properties in Nueva Ecija and Paracale in September and left for home October 10. He was agreeably impressed with the prospects for dredging in the islands but was of the opinion that more development work by the owners would be necessary outside Paracale before capital would be attracted in any large amount.

THE PARACALE GOLD PROPERTY.—The Philippines Dredging Proprietary Co., Ltd., of Melbourne has been organized with a capital of £150,000 for the purpose of taking over 500 acres of alluvial ground and plans for the first dredge have been completed The Board of Directors are the Hon. John McWhae, M. L. C., and A. Burlingame Johnson of Manila. Mr. A. F. Showers of Melbourne is secretary.

This was distributed as follows:—

Reserve	97,239
Special reserve	97,239
Contribution to Tokyo City	55,764
Contribution to Tokyo City	55,764
Bonus to officials	38,500
Bonus to officials	38,500
First dividend (7 per cent. per annum)	1,522,500
Second dividend (6 per cent. per annum)	130,500
Balance carried forward to next accounts	25,274

THE SZECHUAN RAILWAY.—The Ichang correspondent of the *North China Daily News* states that 40000 coolies are at present employed and gives the following result of the activity of this company on the Iwang section during the last one and one-half years:

The Construction Department is said to have paid out up to the end of the 4th moon of this year a little over $3,000,000. The cost of material brought from abroad and locally has been about Tls. 1,200,000. Some Tls. 600,000 worth of this material is still in stock in the store yards or along the line. About eight miles of line have been laid and the construction trains are running on this, while the embankment and bridges on another twenty-five miles are finished and, were it not for some deep cuttings and tunnels, the rails might be laid on this whole length.

Up to date the following have been completed: Two stone landings at Ichang, three store houses, earthwork for the wharf and Ichang station yard, Ichang station buildings and two platforms, four station buildings along the line, two locomotive sheds, one water tower and two deep wells, one temporary machine-shop building with machines put up in working order, one residence building for the staff of the chief store department, two residence buildings for the staff and other employees of the locomotive department, two tunnels holed through of a total length of 1,600 feet, fifty bridges, 100 drains.

The following are under course of construction:—

One permanent machine shop, eight tunnels, one coal yard, foremen's quarters and platelayers' cabins for the first section, the building for the construction head office, about sixty bridges and the same number of drains.

The report of the experts is illustrated with several views and a map of the country and is in all a complete confirmation of the claims advanced by the owners.

The properties tested include 310 acres of ground of the Paracale Gold Dredging Co., 150 acres of the Melville and Fingal Claims, and 60 acres of the Nueva California, making in all 520 acres.

On the Paracale Gold ground 64 holes, including twelve blanks, were drilled to an average depth of 32 feet and give an average value of 28.1 cents U. S. C. per cubic yard.

On the Melville property 13 holes, were drilled to an average depth of 25 feet and realized an average value of 42 cents U. S. C. per cubic yard.

On the Nueva California seven holes were drilled to an average depth of 25 feet giving an average value of 55.6 cents U. S. C. This property was previously tested by Mr. Hanlon who put down 26 holes giving an average value of 32 cents a yard.

In concluding his report Mr. John W. McWhae says:

"In conclusion, after our thorough investigation, I have no hesitancy in recommending the properties as very desirable and valuable ones, provided large capacity dredges, designed to fit the peculiar conditions existing at Paracale, are installed."

Concluding his report Mr. J. Bertinshaw says:

"In conclusion, I consider the property a very valuable one, but would strongly recommend close connected buckets with a capacity of not less than six feet, so as to get away with the overburden quickly.

"If dredges such as I have mentioned are put on the property, I feel sure each one would more than double the yields now being obtained by the dredge operating on the lease without to any great extent increasing the working expenses".

For purposes of comparisou the report contains the values of ground worked in Victoria as follows:

The Campbell's Creek Dredging Company, Castlemain, values per cubic yard 4½d (9 cents gold), cost of saving, 2½d (5 cents gold), per cubic yard; material treated during the half year ended March 18, 1911, 331.540c. yds. and dividends paid to amount of £4000 during the term.

The Junction Dredging company's ground gives about the same value as the Campbell's Creek and the Perseverance Gold Dredging Co. operates in 3¾d (7½ cents gold) ground at a profit.

With Paracale ground averaging from 14d (28 cents gold), to 27½d [55 cents gold], per cubic yard and the highest estimated cost of saving being placed at 2½d [5 cents gold] per cubic yard, the company should work out large dividends.

Director McWhae arrived in Manila early this month to conclude arrangements for preliminary work and proceeded to Hongkong for the purpose of submitting plans for bids on the construction of the first dredge. The old dredge on the Paracale Gold Property taken over by the Melbourne Company is in operation. The last clean-up produced 207 ounces.

THE HEADQUARTERS MINING CO.—The report from this property indicates that, due to storms and other causes incidental to the opening of a new plant, the mill has not yet been given an opportunity to demonstrate adequately the returns from the property. The latest monthly clean-up with the plant running only a portion of the time, and then not to its full capacity, is reported to be worth about ₱7,000, and calculating from this basis, when at its full capacity, the returns should reach ₱20,000 every month.

THE MALAGUIT RIVER DREDGING.—For the quarter ended June 30 the sum of ₱6,000 represented the net profit distributed among the owners of the ground and the owners of the dredge. Of this the owners received 30%. The returns to the dredging company represents a large percentage on investment. As the operation on this river continues the values in gold increase.

CONTRACTING NEWS

CONTRACTS AWARDED.—PHILIPPINE GOVERNMENT—15,000 tons of coal.—Contract awarded Macondray & Co. Ochi Coal.

MUNICIPALITY OF SHANGHAI—Induction motors miniature lamps, time switches and transformers.—Construction of substation, and house service fuse boxes.

Induction Motors.—Of the tenders received for twenty one phase induction motors, the following have been authorized for acceptance:—

					£	s.	d.
Arnhold, Karberg and Co	4	3	H. P.	motors	76	8	0
Inniss and Riddle	5	5	,,	,,	120	7	6
Inniss and Riddle	8	12	,,	,,	372	0	0
Siemens China Elect. Eng. Co	3	20	,,	,,	175	10	0

Miniature Lamps. Time Switches and Transformers.—Tenders were invited for the supply of 4,000 miniature metallic filament lamps for use in parallel on 10 volt circuits, also for Time Switches and small Transformers, and, upon the recommendation of the Electrical Engineer, the following have been authorized for acceptance:—

Arnhold, Karberg and Co., 4,000 Miniature Lamps	£127	0	0
Messrs. Samuel and Co., 12 Time Switches	113	10	0
Messrs. Samuel and Co., 12 Transformers	114	0	0

Sub-Station.—Of five tenders received for the construction of a Sub-Station to contain extra high tension switch gear, lighting-arresters and transformers at the Shanghai Roller Flour Mill, Ichang Road, that of the Vulcan Iron Works, Ld., Tls. 555 has been accepted. The other tenderers are Soy Chong, Tls. 560, Fah Shing Ironworks Tls. 588, Kien Chong, Tls. 595 and the Shanghai Dock and Engineering Company, Limited, Tls. 812.

House Service Fuse Boxes.—Sixteen tenders were received in response to Notification 2120 for House Service Fuse Boxes, and upon the recommendation of the Engineer that of Messrs. W. T. Henley's Telegraph Works Co., Ld., has been accepted at a cost of £120 16s. 8.

PROPOSALS INVITED

PHILIPPINE GOVERNMENT.—Gas Franchise Manila and Province of Rizal.—Sealed proposals for the franchise set forth in Act Numbered Two thousand and thirty nine of the Philippine Legislature, to construct, maintain and operate gas systems for the furnishing of gas for heat, lighting and power in the City of Manila and the Province of Rizal, Philippine Islands, will be received at this office up to eleven o'clock A. M. on Monday, December eighteenth, nineteen hundred and eleven. No bid will be considered unless accompanied by cash or a certified check to the order of W. Cameron Forbes, Goveruor General, in the amount of Five Thousand pesos to guarantee acceptance of the franchise under the terms of the bid, and unless a statement be made therein that said sum of Five thousand pesos shall be forfeited to the Government of the Philippine Islands as liquidated damages in the event of failure on the part of the bidder to comply with the terms of his bid. The check or cash of each unsuccessful bidder will be returned to him immediately upon the rejection of his bid. No bid will be considered unless it is stipulated therein that the bidder will pay a lump sum to the Government of the Philippine Islands for and in consideration of

FAR EASTERN ENGINEERING CONSTRUCTION, COMMERCIAL AND FINANCIAL NEWS

ELECTRIC RAILWAYS, LIGHT, POWER, TELEGRAPHS, TELEPHONES, AEROPLANES, ETC.

INSTALLATION AT SHANGHAI.--Two Siemens' alternators of 600 K. W. each were installed in the new cotton mill erected on Soochow Creek by the Home & Foreign Cotton Co. Ltd., opened this month. The generating plant is supplied with power by two Babcock & Wilcox water tube boilers while two Belliss & Morcom triple expansion engines of high speed type are installed. The company represents Japanese capital.

CHINA LIGHT & POWER CO.—The report for the year shows a net profit of $5,728 which was carried forward. The chairman stated that there had been an unusual delay in installing the three engines ordered. One was now working and when the balance were installed the efficiency of the plant would be enhanced.

AVIATION IN CHINA.—Fung Yu, who accomplished several successful ascents recently in Canton, has announced his purpose to return to America in view of the lack of interest of the Army Board in promoting aviation for military purposes.

WIRELESS ON PHILIPPINE TRANSPORTS.—The U. S. Quartermaster's Department have been installing Telefunken wireless on the interisland transports Warren and Liscum. The equipment used is two k. w. with a radins of 250 miles. Other vessels will be equipped as soon as feasible.

CEBU ELECTRIC LIGHT PLANT.—This company proposes to add an additional unit of 200 K. W. to its generating plant in view of t e steady expansion of its operations. It paid a dividend of 18% for the last eleven months of 1910 and 5% for the first quarter, 1911.

the granting of the franchise in accordance with the terms thereof as set forth in Act No. 2039, within ninety days after the sending of formal notification of acceptance of the bid. This notification will be placed in a sealed envelope and sent by registered mail to the address given in the proposal which should contain an address in the Philippine Islands to which the bidder desires notification to be sent. Bids will be opened by the Executive Secretary at eleven o'clock a. m. on Monday, December the eighteenth, nineteen hundred and eleven.

The right to reject any and all bids is hereby reserved.

W. CAMERON FORBES,
Governor General.

U.S. ARMY, PHILIPPINES:—2,400,000 pounds of potatoes and 480,000 pounds onions.—Contract awarded Messrs. Castle Bros Wolf & Sons whose bid approximated ₱111,800.

BIDS OPENED

PHILIPPINE GOVERNMENT.—63,000 feet planed and 91,000 feet rough ipil lumber—Tuason and San Pedro ₱174 per m. rough and planed; Findlay Richardson & Co. ₱180 per m. rough ₱180 per m. planed.

Pedro C. Quinco, ₱174 per thousand feet; D. C. Chuan, ₱209.50 per thousand for the rough, and ₱258.50 for the planed; Manila Saw Mill Company, ₱175 per thousand for rough, and ₱195 for the planed; Chua Tenco, ₱175.50 per thousand for the rough, and ₱224.50 for the planed; S. A. Reich, ₱185 per thousand for the rough, and ₱240 for the planed; and Tuason and San Pedro ₱200 per thousand for the rough, and ₱220 for the planed.

TOKYO MUNICIPAL TRAMWAY PURCHASE.—The following purchase bonds ordinance has been approved by the council:

Article 1.—English currency bonds for £9,-175,000 sterling face value shall be issued in the course of the 44th fiscal year (April 1911-March 1912) to raise a fund for the electric business undertaken by the Municipality.

A portion of the above-named bonds may be converted into domestic bonds, in which case the English pound shall be computed at the rate of 9 77 *yen* Japanese currency.

Article 2.—The issue of these bonds may be entrusted to the banks, or financial corporations, who accept them.

Article 3.—The rate of interest on the bonds shall be under 5 per cent. of the face value and be fixed at the time of their issue.

Article 4.—The certificates issued for the loan shall be unsigned bonds with coupons.

Article 5.—The interest on the bonds shall be payable twice a year, at the end of every six months.

Article 6.—The payment of interest on the bonds and the redemption of the principal shall be borne by a special municipal account for the electric business, and the principal of the loan shall be redeemed by lottery or by some other means within thirty years following the date of issue.

Article 7.—The denomination of the bonds, the method of paying interest and of redemption and all other procedure shall be determined b the Mayor of Tokyo, subject to the approval of the Aldermen's Council.

According to the estimate, the proceeds of the loan are to be appropria ed as specified hereunder:—

	Purchase price applied to Tokyo Railway Co. Yen.	Cost of construction of new lines. Yen.	Cost of installation of electric light power. Yen.
44th fiscal year..	63,915,518	20,000,000	2.260,000
45th " ..	—	20.000.000	1,900,000
46th " ..	—	30,000,000	1,015,000
47th " ..	—	30,000,000	623,000
48th " ..	—	6,000,000	325,000
Total......	63,915,,518	106,000,000	6,123,000

THE OSAKA ELECTRIC LIGHT CO.—This company paid 12 per cent half-yearly dividend for the term. It has recently new dynamos to the Ajikawa generating station and will complete the second station before the year closes. The company supplies electrical machinery as well as current. It now serves over 432,000 incandescent lights, an increase of over 68,000 in six months.

DAVAO WIRELESS.—A 10 k. w. station Telefunken apparatus has been installed at this point. It will be capable of communicating with all points in Mindanao as well as Manila and the China Coast.

MANILA ELECTRIC.—Final tests of the new Allis-Chalmers turbine generator installed in thepower plant ofthiscompany were most satisfactory. The company's contribution to the internal revenue department representing 2½% of the gross receipts was ₱60,453 which would make the gross revenue for the fiscal year ₱2,421,720.

PUBLIC WORKS, DOCKS, WHARVES, BUILDINGS, ETC.

RUSSIAN ACTIVITY ON THE AMUR.—In order to open up all the waterways as freight feeders to the Amur Railway the Russian minister of ways and Communications has made the following recommendations:

1.—The bar of the Amur estuary must be removed for the passage into Nikolaevsk of ocean-going vessels of every draught.

2.—The port of Nikolaevsk must be deepened for the unrestricted unloading of ocean-going vessels.

3.—The conditions of navigation on the Amur, if possible in a technical sense, ought to be brought to such a pitch that ocean-going vessels, after being lightened at Nikolaevsk, may ascend as far as Habarovsk.

4.—In the event of the realization of the aforesaid desire, it is essential that Habarovsk should be adapted to the accommodation of maritime freight.

5.—At the same place goods warehouses and grain elevators must be constructed.

LIAO RIVER IMPROVEMENT.—This work includes the deepening of the channel 200 feet in width for 5 feet additional so as to make the channel from 22 to 28 feet deep at high water mark, the closing of the West Junk passage, and the deepening of the river beside works on the upper reaches of the river. The estimated cost is approximately Tls 800,000.

NEW LIOTUNG HARBOR.—The construction of a harbor south of Hulutao promontory on the Gulf of Liotung at a cost of Tls. 10,000,000 is proposed. The promontory extends about two miles into the gulf and the south side offers a protected harbor open practically all the year.

FILIPINO Y. M. C. A.—The International Committee has donated ₱280.000 towards the construction of a building exclusively for Filipinos to cost ₱355,000 provided the latter make up the balance by subscription which is practically assured.

KOBE HARBOR WORKS.—In 1906 the government appropriated yen 3,960.000 for a six year undertaking and again in 1907 a ten year program covering an estimated expenditure of yen 16,740,000 was authorized. A summary of the work accomplished up to end of the last fiscal year is given by the Japan *Times* as follows

a.—Reclaimed area:	sq ft.
Reclaimed land No. 1	23,072
Reclaimed land No 2	48.000
Reclaimed land No. 3	54,000
Foundation of mole No. 4	10 800
Total	135,872

b—Dredged area.......................... 314,442 ft.

c—Landing stage completed.............. 864

d—Breakwater completed.................. 2,628

e—Ferro concrete caissons made and used for constructing the quay-walls:

	Caissons made.	Caissons used.
Mole No. 4 (of 30 ft. below low tide)......	14	13
Mole No. 1 (of 33 ft. below low tide)......	4	4
Mole No. 2 (of 36 ft. below low tide)......	3	2
Total length.........	2,520	2,280

f—The wood sheds along the landing stage:

	Span. ft.	Length. ft.	Area covering. sqf ft.
Shed No. 1	72	336	24.192
Shed No. 2	72	192	13.824
Total area			38,016

g—Roads and Bridges:

	Width. ft.	Length. ft.
Roads	60	576
Roads	72	420
Bridge	90	60 ft.

h—Temporary Breakwater.................... 300 ft.

i—Coast Breakwater 960

j—Dimensions of the caissons for breakwaters:

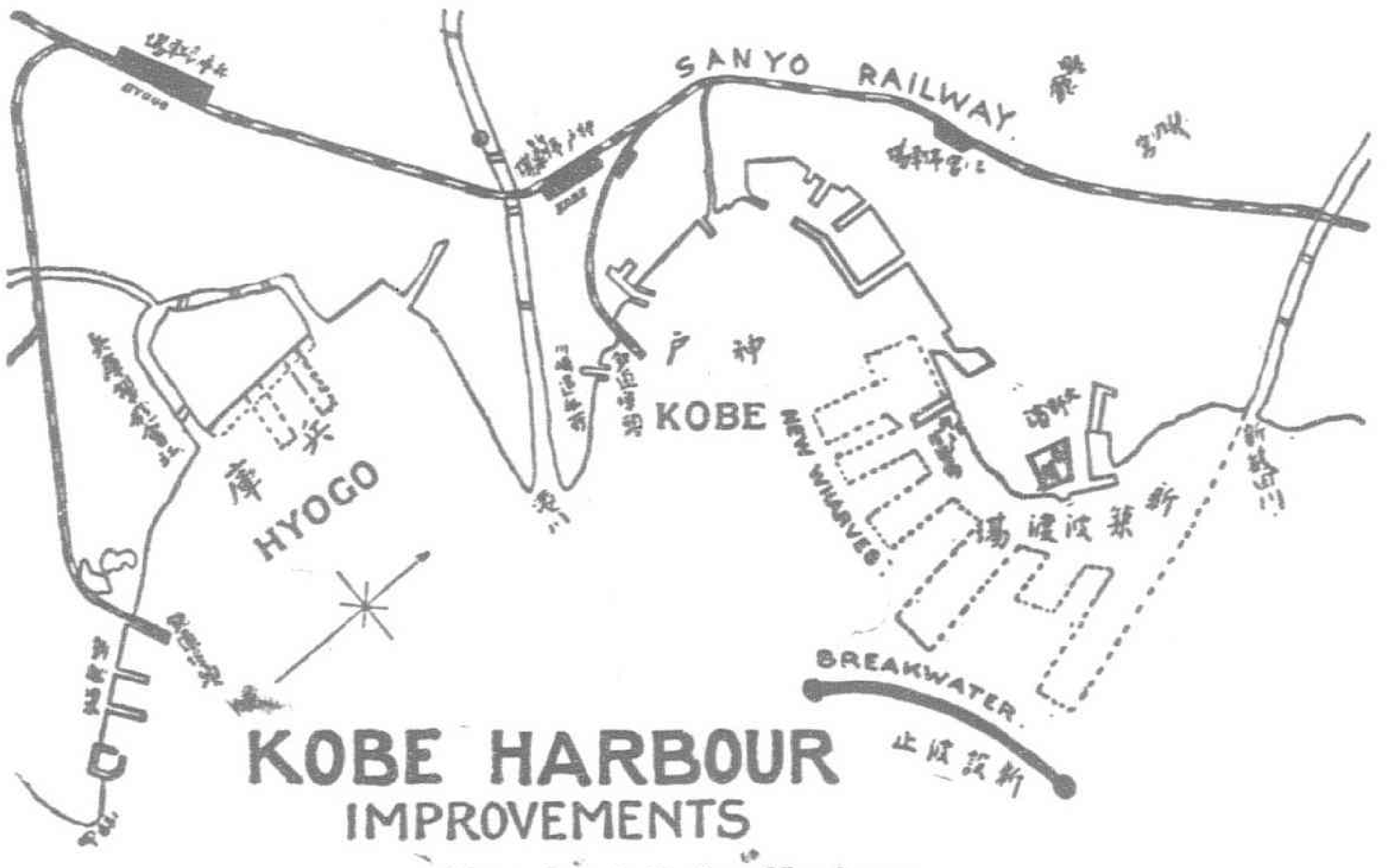
Length.	Width.	Height.	Weight.
ft.	ft.	ft.	tons.
40	21	21	400

k—Chief boats used for construction works:

Small steamboats	6
Dokai Maru (for dredging and reclamation)	1
Owada Maru (for dredging)	1
Priestman dredgers	4
Crane boats (can raise or lower the freights of from 1 ton to 20 tons)	7
Pile driving boat	1
Boats to carry mud and sand	16
Boats to carry concrete blocks	7
Floating dock	1

l—Employees:

Crew	263
Others	752
Total	1,015



Sketch of Kobe Harbour.

Straits Settlements Harbor Boards:—In the Governor's annual statement the following reference was made to the harbor boards:

The net revenue of the Tanjong Pagar Dock Board for the six months ending 30th June, 1911, was $756,880, an increase of $83,274 over the figures for the previous half-year. The total net revenue for the year ending June 30, 1911, was $1,430,486.

The number of vessels using the wharves during the year ending June 30, 1911, was 2,404, with a gross tonnage of 4,698,160. the quantity of coal and cargo handled being 2,333,832 tons.

The net revenue from the Government Wharves, Penang, for the half-year ending 30th June, 1911, was $49,964, and for the half-year ending December 31, 1910, $47,789, making a total for the year of $97,753. The cargo and coal handled during the six months ending June 30, 1911, being 264,170 tons and 233,799 tons for the six months ending December 31, 1910, making a total of 497,969 tons for the year.

Messrs. John Aird & Co., the contractors for the new wet dock and main wharf reconstruction, having declined to continue work under their contract, the Dock Board entered upon the works on the 8th March, 1911, and relet the contract to Messrs. Tropham Jones and Railton, the contractors for the graving dock at Keppel Harbour, who commenced work on 18th July, 1911, the most pressing work having in the meantime been carried on departmentally.

The action of the former contractors will delay the completion of this section of the Dock improvements for some three years, a result which in view of the urgent need of extended wharfage cannot fail to be very prejudicial to the port of Singapore and so to the Colony.

Of the main wharf reconstruction a length of 500 feet at the west wharf has been completed by the Board departmentally.

The progress of the new graving dock at Keppel Harbour has been very satisfactory, the daily average number of men employed being 1,900 and the value of the work executed to June 30th, 1911, being £175,000.

The extensions of Swettenham Pier at Penang have been completed and the construction of over-water godowns on the inner side of the Pier is well advanced.

Lumber Yards of the Bureau of Supply.—Two buildings of reinforced concrete 50×150 feet for lumber sheds are being erected on the new port area in Manila and other sheds with a floor area of two blocks and capable of taking care of 5,000,000 feet will be added from time to time.

SHIPBUILDING, MERCHANT MARINE, FISHERIES, ETC.

The Toyo Kisen Kaisha.—The following statement was approved at the last half yearly meeting:

	Yen.
Profit	329,847
Brought forward from last account	12,289
Total	343,136
To reserve	17,000
Dividend (12 per cent. on new shares and five per cent. on old shares)	318,500
Carried to next account	7,636

Nippon Yusen Kaisha Active.—This company it is reported has decided to discontinue its present working agreement with the Great Northern and will open its own offices in Seattle which city will in future be the terminal instead of Tacoma.

The Hongkong and Whampoa Dock Co., Ltd.—The report submitted at the last half yearly meeting shows a net profit of $66,595 for the term, out of which a dividend of $1 per share was paid. This sum is equal to the total profits for the previous year and indicates increased activity in the different departments. In the course of his remarks the chairman said:

"We have six dry docks and two slipways, and I am glad to tell you that on several occasions during the period under review we had all our docking accommodation taken up. All we want now is more work, and I have no doubt that when the reflection of the brisk condition of trade at Home, as shown by Board of Trade returns, reaches the Far East, we will obtain an increased volume of business for our establishments. There is an increasing demand for medium-sized steamers in this district, and while a few such boats have been placed with several builders on the China Coast the contract prices were so unremunerative, and the obligations attached to the contracts so difficult of fulfilment, that we consider nothing has been lost by these orders having gone past us. In smaller craft we do fairly well, and we have had a good share of trade in auxiliary machinery, boilers, general engineering and constructional work. In hand at present are a number of steam launches, motor boats, wooden barges, several new tramcars, and quite a lot of constructional work, and we have just secured an order for a steamer 180 feet in length. You will be glad to know also that our dredger, the Canton River, has been chartered to dredge Macao Harbour at a satisfactory rate. It is expected that this charter will go on for a considerable period, and if so it will be a source of added income to the Company. Out of revenue we have maintained all our establishments in first-class order. We have not added much to our plant during the six months, the principal item being a small steam launch, which we found necessary, and which we are now running as a ferry boat between Hongkong and the docks. This service is a great convenience, and is much appreciated by our clients.

Manuel Earnshaw & Co. to Increase Plant.—This progressive company is preparing plants for the construction of a new slipway and marine railway on the new port area which will represent an investment of ₱1,000,000.

Saigon, Manila and Japanese Ports.—The Philippine Government also favors this project and it is not improbable that special inducements will be made for a regular service between Manila and Japan.

Canadian Pacific Steamers.—Two steamers of 15,000 tons, a length of 570 feet and a speed of 18 knots have been ordered at the Fairfield Dockyard, Glasgow, for the Victoria-Yokohama service. Preliminary surveys have been made by the Atlantic, Gulf & Pacific Co.

Japan-Manila Line.—The Mercantile Marine Bureau is reported to be contemplating a line of steamships to call at Java, Saigon, Manila and Japan ports. The Philippine Government also favors this project and will probably lend its support.

Pearl Harbor Docks.—The big naval drydock building at Pearl Harbor in the Hawaiian Islands, 831 feet long, 110 feet wide and 34 feet deep, is nearing completion. The total cost of the naval base now being constructed at Pearl Harbor will be not less than $10,840,000, of which nearly $3,000,000 has been expended on this big dock.

Siam Steam Navigation Co.—The half-yearly balance-sheet shows a net profit of Tcs. 170,702.80 including the balance of Tcs. 2,943.29 from the preceding half year, whereof it is proposed to utilise Tcs. 50,354.31, being 5 per cent per annum on the cost value of the steamers, 10 per cent per annum on the launches, junks, etc., and the amount of bad debts, as depreciation, leaving Ticals 114,348 49 to be divided as follows:—5 per cent. dividend to the shareholders Tics. 100,000.00; remuneration to the Directors Tcs 1,140.52; carried to the Reserve Account, Tcs. 10,000.00; to be carried forward to next half-year Tcs. 3,207.97.

Japanese Fisheries.—The four Grimsby trawlers acquired by the Japanese Fishing Company at Nagasaki, left Grimsby on their long voyage *via* Suez Canal. The journey will occupy between sixty and seventy days. The vessels are navigated by foreign certificated masters, the Grimsby skippers acting as chief mates. Each vessel will carry a crew of 10 Grimsby fishermen.

New Japanese Dreadnought.—The Mitsu Bishi Shipbuilding Yard in Nagasaki early next year will lay the keel of a 27,000-ton battleship, to be named the Kirishima. The Kirishima will be a sistership to the Kongo, which is now in course of construction in the Vickers' Shipbuilding Yard in England.

MINES, MINERALS AND THE METAL TRADE

New American Enterprise in Kore.—The Morris–McGrav interests, comprising four concessions in North Pyeng-an province, has been taken over by a new organization. Mr. Morris is pice-president and general manager of the new company.

THE YUNNAN-SYNDICATE.—An agreement has been reached with the Chinese government whereby the Syndicate cancels its concession in return for the sum of Tls. 1,500,000 in half-yearly instalments of Tls. 250,000 each.

OIL IN TAIYENFU.—Reports from this section indicate that oil in commercial quantities has been found and that an effort will be made by local merchants to organize a company to develop the district with the assistance of the Board of Industry.

PERLIS TIN INDUSTRY.—The report of Meadows Frost, adviser to the Perlis Government, contains the information that 2,533 piculs of tin were exported during 1910. Of the methods of mining he writes:

"The mining is most peculiar, the ore being found in underground streams and hollows in the limestone range which separates Perlis from Setul. People who have been all over Perak and the other States of the federation unite in saying that the Perlis mines are unique. The miners have followed up an underground stream for over three miles, the entrance to which is through a steep funnel, down which the coolies crawl for a quarter of mile before reaching the stream in which the ore is found and which opens out at different places into large caverns.

TONGKAH HARBOR TIN CO.—This company has declared an interim dividend of 10%. This is the fourth during the present year.

HAHMAN HYDRAULIC TIN CO.--At the recent annual meeting of the company a final dividend of 10%, making 25% for the year, was declared besides $12,000 added to reserve and $12,925 forward.

F. M. S. COAL.—Mr. Scrivenor, Chief of the Department of Mines, in his annual report gives some attention to the coal deposits in Selangor. The coal extends about half a mile and the seam approximates 50 feet.

The mean of five tests gave 9.8 as the evaporative value of one pound of fuel in lbs. of water at 212 deg Fahrenheit.

This compares unfavorably with other coals, the percentage of which is given by the Geologist as follows:

Chinese anthracite	12.4
Borneo coal	14.4
Australian coal	13.4
Indian coal	13.2 and 13.6

He also observes that the coal tested came from close to the surface and it is reasonable to expect that the quality will improve in depth; the discovery, too, of one seam of a certain quality does not preclude the possibility of further seams being found.

RAUB AUSTRALIAN GOLD MINING CO. LTD.—The total output for the four weeks ended September 9 was 577 ounces with an average yield of 2.8 ounces per ton of ore.

THE SHANGTUNG MINING COMPANY.—This company's report for the year gives a revenue from coal sales of M. 247,719, as compared with M. 407,651 in 1909-10, after deducting expenses for management and output. The payment of interest amounts to M. 168,195 (1909-10, M. 137,711); M. 448,859 (1909-10, M. 428,456) are written off, so that the loss increases by M. 364,038 to M. 963,311. The report says that the year 1910-11, which had begun with good prospects and active sales, was disappointing in its further course. Especially the sale of the Fangtse coal was checked, so that restriction of the output was necessary. The last quarter of the year was influenced unfavorably by the plague. The output of the Fangtse pit amounted to 194,897 tons, as compared with 273,354 tons in 1909-10; the output of the Hungshang pit to 237,544 tons, as against 183,450 tons. The first quarter of the current year has delivered a revenue of M. 110.000.

FORMOSAN GOLD.—Three mines near Keelung are reported to have produced 50,000 ounces during the year 1910.

HANGYANG IRON WORKS.—This company produced over 130,000 tons of pig iron in 1910 of which 29,000 tons went to Japan and 15,000 to the United States.

PINGSIANG COLLIERY.—The export of coal and cake for the last year from these mines amounted to 96,000 tons of coal and 160,000 tons of coke.

FINANCIAL, COMMERCIAL AND MISCELLANEOUS NEWS

PHILIPPINES REVENUE.—The total collections by the Internal Revenue Bureau for the fiscal year 1911 amounted to ₱19,211,127.62 as against ₱17,527,824.54 in 1910 or a 9.6% increase. The cost of collection was 3.35% as against 3.75% in 1910. Of these revenues the collections for the city of Manila were ₱3,095,783 compared with ₱2 975,103 in 1910.

STRAITS SETTLEMENTS TRADE.—The imports for the six months ended June 30, 1911, amounted to £40,300,000, an advance of 1408% and the exports £35,900,000 practically the same percentage of increase. The principal increase in exports was 5,453,600 lbs. of rubber, an increase in quantity of 4,459,867 lbs. and in value $1,750,000 over the corresponding first half of 1910.

CHINESE COMMERCIAL COMMISSION TO JAPAN —The following is the personnel of the Commission announced to leave Shanghai for Yokohama on October 24:

From Shanghai: Messrs. Shen Tunho, Yang Hsin-chit, Shao Chin-tao, Chou Chin-chen, Yi Hung-ying, Su Yu-shang and Chu Chih-yao, also Mr. S. Nien-hsin, delegate of the National Agricultural Society.

From Tientsin: Mr. Sung Tse-chue and four others.

From Hankow: Messrs. Lu Hungchang, Wang Ping-sheng, Chang Pichuan, Yuan Ching-cheng, and Chang Shu po.

From Hangchow: Messrs. Shou Hoching and Lui Tsui-chit.

From Chentu: Mr. Ho Lu-sung.

From Soochou: Messrs. Su Chiachin and Hang Hsia-hsien.

From Hunan: Messrs. Huang Chung-hao, Tung Kuang-yi and Chii Chun-pu.

From Peking: Mr. Chas Yen-neng.

From Chefoo: Messrs. Sun We-shan, and Li Hsing-hsien.

From Wusih: Messrs. Huo San-chin and Hua Shu-chin.

From Chinkiang: Mr. Kuo Li-cheng.

From Wuhu: Mr. Wang Meng-chou.

From Shasi: Mr. Wang Yuang-kao.

Messrs. Mo Shu-wei and Chao Chiilin will be secretaries.

JOHNSON PICKETT ROPE CO.—A consolidation of the well known Johnson-Picket Rope Co. and the Santa Mesa Rope Works with a capital of ₱500,000 was consummated last month with a view to further expansion. Both companies have been active in this branch of industry in Manila for many years and the reputation of their output is world wide. The directors of the new company are: Milton E. Springer, Emil H. Johnson, M. Jeran, John T. Pickett, and Hartford Beaumont.

MANILA'S FIRE LOSSES. The report of the Manila Fire Department contains the following tabulated annual losses by fire since 1902:

1902—₱50,085.
1903—₱1 670,649.90.
1904—₱468,911.
1905—₱135,931.
1906—₱76,034.
1907—₱677,709.
1908—₱280,516 62.
1909—₱342.452.45.
1910—₱1,215,980,
1911—₱497,984.

CHARTERED BANK DIVIDEND.—This institution declared an interim dividend of 13% for the half year ended June 30.

THE IMPERIAL CHINESE POST OFFICE.—The report for the year 1909 shows that the number of postal agencies, including box-offices, letter-boxes and pillar-boxes, has been raised from 3,493 to 4,258, while the number of letters, postcards, newspapers, books, samples, etc., has increased from 253 to 306 millions. An increase from 2,455,000 to 3,230,000 in the number and kilos from 7,155,000 to 9,176,000 in weight, of parcels is recorded.

Registered letters have also increased from 19 to 25½ millions.

The money order office increase of two million dollars over the figure of last year brought the total amonnt of transactions to the appreciable sum of nearly ten million dollars.

ANOTHER CORDAGE PLANT FOR MANILA

The Tubbs Cordage Co., operating large Cordage Mills at San Francisco, Cal., Portland, Oregon, and Seattle, Washington, has concluded to install a modern cordage manufacturing plant in Manila. Complete plans of the building and machinery have been prepared, utilizing the experience of fifty years cordage manufacturing in the design of buildings and machinery and the mill will be the most efficient cordage manufacturing plant that can be constructed. The investment in buildings and machinery will be ₱600,000.00 and the working capital requirements in addition to construction will fix the total investment at ₱1,000,000.00.

Mr. H. D. Nichols, Vice President and General Manager of the Tubbs Cordage Co., will arrive in Manila about the middle of December and it is contemplated to have the mill in full operation within a year and half after his arrival.

The general management of the business will be in the hands of Captain Heath, General Manager of the Philippine Plantation and Commercial Co., and with him will be Captain A. J. Brazee, who has already been brought to Manila from Masbate where he has been the provincial manager of the business of the Philippine Plantation and Commercial Co.

*LONDON METAL MARKET

SEPTEMBER 1, 1911

COPPER.	£ s. d.	£ s. d.
*Tough cake and ingot	59 5 0	59 15 0
*Best selected	59 10 0	60 0 0
*Electrolytic	60 0 0	60 10 0
*Sheets and sheathing	71 0 0	—
*Flat bottoms	74 0 0	—
*Copper tubes, seamless per lb.	0 0 8½	—
*Lake	60 5 0	60 10 0

* Less 3½ per cent. † Net.

ALLOYS.

BRASS: Wire	0 0 6¾	—
,, Tubes (solid drawn)	0 0 6⅞	—
,, Sheets	0 0 7½	—

TIN.

English ingots, f. o. b.	187 10 0	188 0 0
,, bars	188 10 0	189 0 0
,, refined	189 10 0	190 0 0
Banka (in Holland) Cash	188 0 0*	—
	—	—

*Close of market for prompt.

LEAD.

English pig, L. B	14 17 6	—
,, sheet and bar lead	16 0 0	—
,, pipe	16 10 0	—
,, red	16 15 0	—
,, white	20 0 0	—
,, patent shot	17 10 0	—

ANTIMONY.

Antimony Crude	11 5 0	12 5 0
,, Ore (basis 50%)	7 5 0	7 15 0

ALUMINIUM.	Per ton.	Per ton.
98-99 per cent	58 0 0	59 0 0

NICKEL.	Per ton.	Per ton.
98-99 per cent. guaranteed	167 10 0	to 171 0 0

PLATINUM.

Per oz. Troy, 178s. 6d.; nominal and subject to negotiation.

---

* Mining Journal.

ALPHABETICAL LIST OF ADVERTISERS

Ackley Adjustable Brake Co.	40
Alhambra Cigar & Cigarette Factory.	42
Allis-Chalmers Co.	8
American Bank Note Co	22
American Locomotive Co	20
American Bridge Co	24-25
American Manchurian S. S. Co	70
American Tool Works	4
American Trading Co	36
Anderson & Co., Wm. H	49
Anderson, Meyer & Co	34
Arnhold Karberg & Co	26
Astor House Hotel Co	76
Babcock & Wilcox Ltd	23
Baldwin Locomotive Works	18
Bazar Siglo XX	7
Banco Español Filipino	Cover
Bell, David W	23
Berry, Henry & Co., Ltd	1
Bohler Bros & Co.	53
Boulton & Paul Ltd	71
British American Tobacco Co., Ltd.	43
Chee Hsin Cement Co., Ltd	50
China Import Export Lumber Co.	54
China Mutual Life Insurance Co.	51
China and Manila S. S. Co	31
China General Engineering Co	33
Chinese Eng. & Mining Co	56
Cia. General de Tabacos Filipinas.	44
Cia. Trasatlantica	44
Claflin Co., The H. B	42
Climax Concrete Machines	77
Clarke, M A	75
Cook's Sons, Adam	65
Cramp., William & Sons	13
Defiance Machine Works	27
Detroit Engine Works	65
Deutsch-Asiatische Bank	1
Dollar, Co., The Robert	47
Easterbrook Allcard & Co	41
El Varadero de Manila	54
Fearon, Daniel & Co	34
Fiat-san Giorgio Ltd	66
Fushun Coal	3
General Electric Co.	72
Germinal Cigar Factory	43
Gordon & Co	4
Goulds Manufacturing Co	68
Gray Motor Co.	33
Green Island Cement Co., Ltd.	48
Greilsammer Bros	70
Hannoversche A. G., Vormals Georg Egestorff	70
Henschel & Sohn	52
Herbrand & Co., P	40
Hongkong Rope Mfg. Co., Ltd	31
Hongkong & Shanghai Banking Corporation	Cover
Hongkong & Whampoa Dock Co., Ltd.	10
Honolulu Iron Works Co	17
Hupeh Cement Co	51
Imperial Railways of China.	57-58-59-60-61
International Banking Corp	Cover
International Cold Stores	7
International Steam Pump Co	67
Jardine, Matheson & Co	29
Johnson-Pickett Rope Co	66
Kawasaki Dockyard Co. Ltd	6
Keystone Driller Co.	53
Kiangnan Dock & Engineering Works	8
La Prueba	45
Leiman Bros	70
Lima Locomotive Works	21
Lodge & Shipley Machine Tool Co.	15
Lodge, James & Co	75
Los Baños Improvement Co	74
Malthoid	78
Manila Railroad Co	24-25
Melchers & Co	16
Middleton & Co. Ltd.	51
Michigan Steel Boat Co	65
Mitsu Bishi Dockyard & Eng. Works	6
Mitsui Bussan Kaisha	5
Morse & Son, A. J	140
Nestle & Anglo-Swiss Condensed Milk Co	2
New Engineering and Shipbuilding Works, Ltd	11
New York Engineering Co	32
Nippon Yusen Kaisha	47
North British Locomotive Co. Ltd.	19
Olsen & Co., Walter E	Cover
Pacific Mail S. S. Co	45
Pacific Tank and Pipe Co	78
Paraffine Paint Co	78
Port Banga Lumber Co	15
Priestman Brothers, Ltd	51
Racine. Ackermann & Co	49
Riter-Conley Mf'g Co	31
Rose, Downs & Thompson, Ltd	77
Russo Asiatic Bank	1
Rendrock Powder Co	15
Schuchardt & Schütte, Berlin	41
Selson Engineering Co. Ltd	73
Shanghai Dock & Eng. Co., Ltd	12
Shanghai Gas Co., Ltd	32
Shanghai Machine Co	30
Shanghai-Nanking Ry	63
Shewan, Tomes & Co.	28
Siemens China Electrical Engineering Co	39
Southern Pacific Co	30
South Manchuria Railway Mining Dept	3
South Manchuria Railway	62
Springer, The Milton E., Co	27
Standard Oil Co. of New York	14-35
Stevenson & Co., Ltd., W. F	7
Strong, Frank L	36
Swift & Co	40
Taikoo Dockyard and Engineering Company of Hongkong, Ltd	11
Thompson, F. H	65
Toyo Kisen Kaisha	37
Trussed Concrete Steel Co	41
Tsingtauer Werft	10
Tyer & Co	69
United States Steel Products Co	38 46-52-55-68-71
Vanderloo & Co., F. A	37
Vulcan Iron Works	65
Wen Ming Press	7
White & Co. (Inc.). J. G	13
Western Electric Co	17
Westinghouse Brake Co., Ltd	53
Western Valleys Anthracite Co.	78
W. T. Henley's Telegraph Work Co., Ltd	18
Woosung Car Shops	64
Yale Town Mfg. Co	33
Ynchausti & Co	31
Young, C. G	69

Classified Advertisers' Directory

(Please mention this journal)

ADDING MACHINES
Greilsammer Bros.

AGRICULTURAL IMPLEMENTS
Anderson & Co. W. H.

ALCOHOL DISTILLERS
Cia. General de Tabacos de Filipinas.
Ynchausti & Co.

BANKS
Deutsch-Asiatische
Hongkong and Shanghai Banking Corp.
International Banking Corp.
Banco Español Filipino
Russo-Chinese Bank

BOILERS
Babcock & Wilcox Ltd.
Shanghai Dock & Engineering Co. Ltd.

BOILERS (PATENT WATER TUBE STEAM)
General Electric Co.
Jardine Matheson & Co.

BRIDGE-BUILDERS
White & Co., Inc., J. G.
Shanghai Dock & Engineering Co. Ltd.

BUILDING MATERIALS
Malthoid Paraffine Paint Co.
W. H. Anderson & Co.

CABLES, TELEPHONE, TELEGRAPH SUPPLIES
David W. Bell
W. T. Henley's Telegraph Works Co., Ltd.
Melchers & Co.

CEMENT
Anderson & Co., W. H.
British American Tobacco Co.
Chee Hsin Cement Co., Ltd.
Chinese Engineering and Mining Co., Ltd.
Green Island Cement Co., Ltd.
Racine, Ackermann & Co.

CHIMNEYS
Babcock & Wilcox Ltd.

CIGAR AND CIGARETTE MANUFACTURERS
Alhambra Cigar & Cigarette Factory.
Cia. Gral. de Tabacos de Filipinas
Germinal Cigar Factory
Olsen & Co., Walter E.
La Prueba

CIVIL ENGINEERS
C. G. Young

COAL DEALERS
Western Valleys Anthracite Co.
Chinese Engineering and Mining Co., Ltd.
The Mitsui Bussan Kaisha
South Manchuria Railway Co.

COAL HANDLING MACHINERY
Babcock & Wilcox Ltd.

COFFEE DEALERS (WHOLESALE)
M. A. Clarke (Mayon)

CONCRETE MACHINES
Climax Concrete Machines

CONTRACTORS, (GENERAL)
Bohler Bros. & Co.
Frank L. Strong
Gordon & Co.
Shanghai Dock & Engineering Co. Ltd.
White & Co. Inc., J. G

CONTRACTORS, ELECTRICAL
Shanghai Dock & Engineering Co. Ltd.
Arnhold, Karberg & Co.
Germann & Co. Ltd.
H. Berry & Co., Ltd.
Shewan Tomes & Co.
Frank L. Strong
Siemens China Electric Engineering Co

CONSULTING ENGINEERS
White & Co., Inc. J. G.
C. G. Young

CRANES
Babcock & Wilcox Ltd.

CONVEYORS
Babcock & Wilcox Ltd.

DIVING APPARATUS
A. J. Morse & Son

DREDGERS
Middleton & Co., Ltd.
Melchers & Co.
New York Engineering Co.
Priestman Bros. Ltd.
Rose, Downs & Thompson, Ltd.
Shanghai Dock & Engineering Co. Ltd.

DRILLING MACHINES
The Keystone's Driller Co.

DRY CELLS
F. H. Thompson.

DRY GOODS, WHOLESALE
The H. B. Claflin Co.

ECONOMIZERS
Babcock & Wilcox Ltd.

ELECTRIC LIGHTING PLANTS
Anderson Meyer & Co.
Arnhold, Karberg & Co.
Boulton & Paul Ltd.
Fearon, Daniel & Co.
General Electric Co.
Siemens China Electric Eng. Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co. Ltd.
Shewan, Tomes & Co
U. S. Steel Products Co.
Western Electric Co.

ELECTRICAL SUPPLIES
Allis-Chalmers Co.
American Trading Co.
Anderson Meyer & Co.
Arnhold Karberg & Co.
H. Berry & Co., Ltd.
Jardine, Matheson & Co.
Babcock & Wilcox (D. W. Bell)
Belliss & Morcom (D. W. Bell)
Fearon, Daniel & Co.
General Electric Co.
Melchers & Co.
Shewan, Tomes & Co.
Siemens China Electric Eng. Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co. Ltd.
U. S. Steel Products Co.
Western Electric Co.

ENGINES (PUMPING)
Allis-Chalmers Co.
Belliss & Morcom (D. W. Bell)
Shanghai Dock & Engineering Co. Ltd

EXCAVATORS AND ELEVATOR
Priestman Bros. Ltd.
Rose, Downs & Thompson, Ltd.
Shanghai Dock & Engineering Co. Ltd.

EXPLOSIVES
Jardine Matheson & Co.
Arnhold Karberg Co.
Rendrock Powder Co.

FEED WATER HEATERS
Babcock & Wilcox Ltd.

FOOD PRODUCTS
Anderson & Co., W. H.
Swift & Co.

GAS ENGINES
Castle Bros.-Wolf & Sons
Detroit Engine Works
Shanghai Gas Co., Ltd.
Melchers & Co.

HOTELS
Astor House Hotel Co.

ICE MACHINERY
Vulcan Iron Works
Melchers & Co

INSURANCE
Stevenson & Co., Ltd., W. F.

JOURNALS, SCIENCE
The Philippine Journal of Science

LIFE INSURANCE
China Mutual Life Insurance Co., Ltd.

LOCKS
Yale & Towne Mfg. Co.

LITHOGRAPHERS
The Wen Ming Press.

LUMBER DEALERS
Robert Dollar Co.
China Import Export
Jardine, Matheson & Co.
Port Banga Lumber Co.

MACHINERY MERCHANTS
Anderson, Meyer & Co.
Arnhold Karberg & Co.
Shanghai Machine Co.
Fearon, Daniel & Co.
Frank L. Strong
Schuchardt & Schutte.
Shanghai Dock & Engineering Co. Ltd.

MILL MACHINERY
Rose Downs & Thompson Ltd.
Shanghai Dock & Engineering Co. Ltd.

MINING MACHINERY
Allis-Chalmers Co.
American Trading Co.
Melchers & Co.
New York Engineering Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co. Ltd.
Shewan, Tomes & Co.

MINING COMPANIES
Chinese Engineering & Mining Co.
South Manchuria Railway Co.
Mitsui Bussan Kaisha

MOTORS
The China General Engineering Co.
The Gray Motor Co.
Shanghai Dock & Engineering Co. Ltd.

MOTOR LAUNCHES
Michigan Steel Boat Co.
Shanghai Dock & Engineering Go. Ltd.

PAINTS OILS AND VARNISH
Standard Oil
Adam Cook's Sons
F. A. Vanderloo & Co.

PULLEYS (STEEL)
Schuchardt & Schütte
Shanghai Machine Co.
Shanghai Dock & Engineering Co. Ltd.

PUMPS
H. Berry & Co., Ltd.
The Goulds Manufacturing Co.
Shewan, Tomes & Co.
International Steam Pump Co.
Jardine Matheson & Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co. Ltd.

RAILROADS
Imperial Chinese Railways
Manila Railroad Co.
Shanghai Nanking.
South Manchuria
Southern Pacific Co.

RAILROAD SUPPLIES
Ackley Brake Co.
American Trading Co.
American Locomotive Co.
Anderson, Meyer & Co.
Arnhold Karberg & Co.
Baldwin Locomotive Works.
Fearon, Daniel & Co.
Hannoversche Maschinenbau A. G. Vormals Georg Egestorff.
Henschel & Sohn.
P. Herbrand & Co.
Jardine, Matheson & Co., Ltd.
Melchers & Co.
Mitsui Bussan Kaisha
Westinghouse Brake Co. Ltd.
Shewan Tomes & Co.
Shanghai Machine Co.
Shanghai Dock & Engineering Co. Ltd.
Tyer & Co.
U. S. Steel Products Co.
Woosung Car Shops.

REINFORCED CONCRETE CONSTRUCTION
Shanghai Dock & Engineering Co. Ltd.
Trussed Concrete Steel Co.
U. S. Steel Products Co.

ROOFING PAPER
Malthoid

ROPE MANUFACTURERS
Hongkong Rope Mfg. Co. Ltd.
Santa Mesa Rope Works.
Johnson Pickett Rope Co.
U. S. Steel Products Co.
Ynchausti & Co.

SANITARY ENGINEERING
Gordon & Co.
Lambert-Springer Co.

SAW MILLS
Jardine, Matheson & Co.
Port Banga Lumber Co.

SERUM
Bureau of Science

SHIP-CHANDLERY
Ynchausti & Co.
Bazar Siglo XX.

SHIPPING AGENTS
Castles Bros.-Wolf & Sons
Cia. General de Tabacos
Shewan, Tomes & Co.
Stevenson & Co., Ltd.

SHIPBUILDING AND REPAIRS
El Varadero de Manila.
Fiat-san Giorgio Ltd.
Tsingtauer Werft
Hongkong & Whampoa Dock Co., Ltd.
The Kawasaki Dockyard Co. Ltd.
Kiangnan Dock and Engineering Co., Ltd.
Mitsu Bishi Dock and Engineering Works
New Engineering and Shipbuilding Works, Ltd.
Shanghai Dock and Engineering Co., Ltd.
The Taikoo Dockyard and Engineering Company of Hongkong, Limited
William Cramp & Sons.

STEAMSHIP COMPANIES
American Asiatic S. S. Co.
China and Manila S. S. Co., Ltd.
Cia. General de Tabacos
Nippon Yusen Kaisha
Occidental and Oriental S. S. Co.
Pacific Mail S. S. Co.
Transatlantica S. S. Co.
Ynchausti & Co.

STEEL MANUFACTURERS
United States Steel Products Export Co.

STEEL WORKS
Bohler Bros. & Co.
Riter-Conley Manf'g Co.
U. S. Steel Products Co.

STOKERS
Babcock & Wilcox Ltd.

STRUCTURAL STEEL
American Bridge Co.
Bohler Bros. & Co.
Riter-Conley Manf'g Co.
Shanghai Dock & Engineering Co. Ltd.
U. S. Steel Products Co.

SUGAR MACHINERY
Honolulu Iron Works.

SUPERHEATERS
Babcock & Wilcox Ltd.

TANKS
Pacific Tank and Pipe Co.
Shanghai Dock & Engineering Co., Ltd.
U. S. Steel Products Co.

TELEPHONES
The Western Electric Co.
The Philippines Telegraph & Telephone Co.

TILES AND BRICKS
Green Island Cement Co., Ltd.
Chinese Eng. Mining Co.

TOBACCO DEALERS
British American Tobacco Co., Ltd
Cia. General de Tabacos
Olsen & Co., Walter E.

TOOLS
American Tool Works Co.
Lodge & Shipley Machine Tool Co.
Shanghai Machine Co
Easterbrook Allcard & Co., Ltd.
The Selson Engineering Co. Ltd.
Shanghai Dock & Engineering Co. Ltd.

WINDMILLS
Fairbanks, Morse & Co.
Defiance Machine Works.

WATER SOFTENERS
Babcock & Wilcox Ltd.

WATER, MINERAL
Isuan.

WOOD WORKING MACHINERY
American Tool Works Co.
Defiance Machine Works.
Lodge & Shipley Machine Tool Co.
Shanghai Dock & Engineering Co. Ltd.

J. J. CHOLLOT
INGENIEUR DES PONTS ET CHAUSSEES
CIVIL ENGINEER, SURVEYOR AND ARCHITECT
53 QUAI DU YANG-KING-PANG, SHANGHAI

A. J. MORSE & SON, INC.
221 High St., Boston, Mass., U. S. A.
ESTABLISHED 1837
DIVING APPARATUS
Special Apparatus built to order
FRANK L. STRONG, Agent -:- 24 Calle Echague, Manila, P. I.